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ANNUAL REPORT
OF THE
SURGEON GENERAL OF THE
PUBLIC HEALTH SERVICE
OF THE UNITED STATES

FOR THE FISCAL YEAR
1929



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Public Health Service

LETTER OF TRANSMITTAL

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
Washington, December 2, 1929.

SIR: In accordance with section 9 of the act of Congress approved July 1, 1902, I have the honor to transmit herewith the report of the Surgeon General of the Public Health Service for the fiscal year 1929.

Respectfully,

A. W. MELLON,
Secretary.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.



CONTENTS

	Page
Foreword.....	1
Division of Scientific Research.....	27
Cancer.....	27
Goiter.....	30
Leprosy.....	31
Malaria.....	35
Nutritional diseases.....	38
Rocky Mountain spotted fever.....	38
Tularaemia.....	40
Epidemiological studies of trachoma.....	40
Administrative health practice.....	40
Child-hygiene investigations.....	41
Industrial hygiene and sanitation.....	44
Milk investigations.....	51
Survey of salt-marsh areas.....	53
Statistical investigations.....	55
Stream pollution.....	60
Hygienic Laboratory.....	64
Viruses, serums, toxins, and analogous products.....	74
Miscellaneous.....	74
Division of Domestic (Interstate) Quarantine.....	75
Plague-suppressive measures in California.....	75
Plague in ground squirrels.....	75
Measures taken against rats.....	76
Operation of Public Health Service laboratory.....	77
Trachoma eradication work.....	79
Sanitary engineering section.....	82
Supervision of water supplies used by common carriers.....	82
Shellfish sanitation.....	85
Public health engineering abstracts.....	85
Cooperative sanitary work.....	86
Interstate sanitary districts.....	87
Rural health work.....	111
Conference of the Surgeon General with the State and Territorial health officers.....	112
Division of Foreign and Insular Quarantine and Immigration.....	114
Quarantine transactions.....	114
General prevalence of quarantinable diseases.....	114
Changes in quarantine procedure.....	115
Amendments to the quarantine regulations.....	117
Meningococcus (cerebrospinal) meningitis.....	117
Commission on ship fumigation.....	119
International Office of Public Hygiene.....	119
Floating equipment.....	121
Violations of quarantine laws.....	121
Quarantine transactions at continental and insular quarantine stations.....	121
Summary of quarantine transactions at continental and insular stations for the fiscal year ended June 30, 1929.....	121
Transactions at continental maritime stations.....	123
Reports from continental quarantine stations.....	123
Mexican border stations.....	144
Quarantine operations along the Mexican border.....	144
Transactions at insular quarantine stations.....	146
Reports from insular quarantine stations.....	146
Philippine Islands.....	148
Porto Rico.....	150
Virgin Islands.....	152

Division of Foreign and Insular Quarantine and Immigration—Contd.	Page
Transactions at foreign ports.....	154
Reports from foreign ports.....	154
Service operations in Europe.....	159
Summary of quarantine transactions at continental, insular, and foreign stations.....	162
Medical inspection of aliens.....	162
Examination of prospective immigrants abroad.....	163
Summary of medical inspection of aliens.....	173
Representation at international and other conferences.....	184
Reports from immigration stations.....	185
Division of Sanitary Reports and Statistics.....	208
Morbidity and mortality reports.....	208
Current monthly mortality statistics.....	208
Collaborating and assistant collaborating epidemiologists.....	209
Weekly telegraphic reports.....	210
Current summaries.....	210
Monthly State reports.....	210
Annual State morbidity reports.....	210
City reports.....	210
Insane, feeble-minded, and epileptic.....	211
International exchange of sanitary information.....	212
Foreign reports.....	212
Prevalence of disease.....	213
Directories of health officers.....	216
Legislation and court decisions relating to public health.....	217
Publications issued by the division.....	217
Health information by radio.....	218
Section of public-health education.....	218
Publications distributed by the division.....	219
Division of Marine Hospitals and Relief.....	223
Classes of beneficiaries and service rendered.....	223
Expenses.....	226
Economies.....	227
Safety X-ray films.....	228
Welfare work.....	228
Insane and chronic patients.....	228
Instruction in first aid.....	229
Dental treatment.....	230
Coast Guard.....	230
Employees' Compensation Commission.....	232
Physical examinations.....	232
Construction and repair.....	232
Supplies.....	234
Medicinal liquors and narcotics for vessels.....	234
Abstracts from reports from marine hospitals and selected relief stations.....	235
Consolidated and detailed tabular reports.....	247
Division of Venereal Diseases.....	267
Scientific research.....	267
Studies of syphilis at the marine hospital, Stapleton, N. Y.....	268
Studies in gonorrhea.....	269
Clinical studies in cooperation with the Bureau of Mines.....	269
Clinical studies of syphilis at Hot Springs, Ark.....	269
Study of the venereal-disease problem among seamen.....	269
Prevalence studies of venereal disease.....	270
Prevalence of syphilis among rural negroes in Mississippi.....	273
Cooperative activities with States.....	273
Notification of cases.....	274
Clinic activities.....	274
The Public Health Service clinic at Hot Springs, Ark.....	275
Educational activities.....	276
Campaign for prevention of venereal disease among seamen.....	277
Narcotics Division.....	292

	Page
Division of Personnel and Accounts.....	293
Public-health districts.....	294
Commissioned medical officers.....	297
Reserve officers.....	298
Attending specialists.....	298
Acting assistant surgeons.....	299
Internes.....	299
Contract dental surgeons.....	299
Epidemiologists.....	299
Hygienic Laboratory.....	299
Pharmacists and administrative assistants.....	300
Boards.....	300
Property records.....	301
Accounts section.....	301
Personnel statement.....	301
Nursing, Dietetic, and Reconstruction Section.....	307
Chief Clerk's Office.....	309
Personnel on duty in the bureau.....	309
Public Health Service library.....	309
Printing and binding.....	310
Buildings and office quarters.....	310
Improvements and economies.....	310
Appendix.....	311
Financial statement.....	311
Quarantine service—Expenditures by stations.....	312
Miscellaneous receipts.....	313

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE

TREASURY DEPARTMENT,
BUREAU OF THE PUBLIC HEALTH SERVICE,
Washington, October 15, 1929.

SIR: In accordance with the act approved July 1, 1902, I have the honor to submit for transmission to Congress the following report of the transactions of the United States Public Health Service for the fiscal year ended June 30, 1929. This is the fifty-eighth annual report of this service, covering the one hundred and thirty-first year of its existence.

One of the important public health duties of the Federal Government is the prevention of the introduction and spread of infectious diseases in the United States from foreign countries. Due to the close relation of commerce to the public health in connection with the spread of epidemic diseases, it is necessary to keep advised currently as to the prevalence of diseases not only in the United States but in so far as practicable throughout the entire world.

WORLD HEALTH CONDITIONS

During the fiscal year there was a constant interchange of sanitary information with other nations of the world through the International Office of Public Hygiene of Paris, the Pan American Sanitary Bureau, and the health section of the secretariat of the League of Nations. Valuable epidemiological intelligence was also received by the Public Health Service through American consuls, officers of the service stationed abroad, and directly from foreign governments.

The International Sanitary Convention, signed at Paris June 22, 1926, and the Pan American Sanitary Code, signed on November 14, 1924, at Habana, have operated greatly to improve the promptness and completeness of the information relating to the prevalence of disease received from various foreign governments.

Any generalization as to the mortality rate for the world must be in relative terms, since the rate of mortality varies so widely in different countries. For example, the death rate in India or China or even certain European cities is several times as high as that in the United States or in most European countries—a fact that in itself constitutes impressive evidence of the results of modern medicine and public health administration.

During the fiscal year ended June 30, 1929, the death rate was not as low as in the two preceding years. In the first place, the two preceding years, particularly the year ending June 30, 1927, were such unusually favorable years that it could not be expected that mortality would continue at such a low level. In the second place, there occurred in the winter of 1928–29 an epidemic of influenza which, although mild as compared with the epidemic of 1920 and the pandemic of 1918–19, reached a large number of the countries for which mortality records are available. In the United States the epidemic

began on the Pacific coast as early as October, 1928, with a peak of the reported cases early in December, and gradually spread eastward, with the peak of cases in the New England States about six or seven weeks later. From June to November, 1928, outbreaks had appeared in several Pacific islands; in fact, in the late spring of 1928 there occurred in the United States a considerable number of influenza and pneumonia deaths in excess of the normal expectancy. The epidemic appears to have reached its peak in most European countries in February, one or two months later than in most of the States of the United States. The first outbreaks reported in Europe were in Ireland, in September, coming to a peak in November; but Ireland suffered a secondary wave in February, when the disease was at its height in the remainder of Europe. The attack rates varied widely from one region to another. In some places the general death rate (all causes) was scarcely affected; in others the maximum weekly death rates were very high, as in Leeds, England (66 per 1,000, annual basis), Namur, Belgium (65), and Lille, France (55). These rates exceeded somewhat the highest rates in American cities. In England and Wales the death rates were the highest since the 1918 pandemic; but in the Soviet States, Austria, Hungary, and Switzerland the recent peaks were considerably below those of the epidemic which visited certain European areas in 1927.

A severe outbreak of dengue occurred in Athens and Piræus in August and September, 1928. It was officially estimated that 90 per cent of the population of these two places were attacked by the disease. Dengue is usually a mild disease, but the prevailing type in this epidemic was more severe. In Athens alone there were over 631 deaths reported from August 1 to September 20, 1928. Although the disease spread to other eastern Mediterranean countries, none of the outbreaks outside of Greece was serious.

The incidence of diphtheria and scarlet fever was higher in practically all of the European countries during the year ended June 30, 1928, than in the preceding year. While in some countries the increase was moderate, in others it was very considerable. Mortality from diphtheria was considerably higher than that caused by scarlet fever in all European towns except those of eastern Europe. A large excess of mortality from scarlet fever over that from diphtheria occurred in Leningrad, Moscow, and Warsaw. In Egypt the mortality from diphtheria has been particularly high, while the incidence of scarlet fever has been almost negligible. Deaths from diphtheria have gradually decreased since the middle of the nineties, but there are still nearly 20,000 such deaths in a normal year in Europe outside of Russia.

Meningococcus meningitis (cerebrospinal meningitis) was unusually prevalent in the United States during the latter half of 1928, and especially during the early part of 1929. Up to the beginning of 1929 there was no undue prevalence of the disease in European countries, but in April and May of 1929 there were more than the normal number of deaths from this disease in England and Wales, Scotland, Germany, and Italy. In the last preceding high period, 1915-1918, the disease appeared in Europe earlier than in the United States, but the reverse was true in the present period of high prevalence. Meningococcus meningitis was also prevalent in Chinese ports during 1929, being particularly severe in Shanghai.

There was in the fall of 1928 an epidemic of plague in India, particularly in the Bombay Presidency, which was the most severe since 1923. However, in the early months of 1929 the plague situation in nearly all ports of the world was more favorable than in previous years. Plague was practically absent in the Mediterranean area and was not much in evidence in Asiatic ports. The disease did not occur on vessels arriving at United States ports during the fiscal year, although it continues to prevail in certain South American countries, and during the fiscal year it appeared in Argentina, Brazil, Ecuador, Peru, and Uruguay.

Typhoid fever continued to decline in most of the countries of the world. The decrease in relapsing fever continued in European countries, so that the disease is now extremely rare.

A considerable number of cases of cholera occurred in India during the present fiscal year. In such a disease as cholera, which occurs in great epidemics, a single year's record has little significance so far as the trend of the disease is concerned. Considering the various years, there has been a noteworthy decrease of cholera in India during the past 10 years.

Yellow fever was reported in Brazil, a severe outbreak occurring at Rio de Janeiro. At the close of the fiscal year the outbreak appeared to be under control, but at that time the disease was reported in the interior of Colombia. These occurrences prove that, notwithstanding the progress which has been made in the fight against yellow fever, constant vigilance is still necessary to prevent this scourge from again securing a foothold in the United States.

HEALTH CONDITIONS IN THE UNITED STATES

Yellow fever did not appear in the United States or its possessions during the fiscal year. Cholera was present in the Philippine Islands during the summer of 1928, but the number of cases reported was small as compared with the outbreaks of former years.

Plague was reported in California and in the island of Hawaii. In California the source of infection was ground squirrels. Two cases were reported during July and August, 1928. In Hawaii infected rats were responsible for the disease. Three cases of plague were reported in Hawaii during the summer of 1928.

Preliminary reports show that the birth rate in the United States birth registration area for the calendar year 1928 was lower than it was in 1927, while the death rate was higher. The figures are, for births, 1927, 20.7 per 1,000; 1928, 19.7 per 1,000; for deaths, 1927, 11.4 per 1,000; 1928, 12.1 per 1,000. The infant mortality rate for 1928 (67 per 1,000 births) was higher than it was in 1927 (64.6).

The birth rate in the United States has been decreasing since 1915, when comparable annual records were first compiled. The 1928 death rate is higher than the average of the preceding seven years, but this rate is lower than that for any year earlier than 1921.

The outbreak of influenza, which began in the spring of 1928, decreased, as usual, during the summer months, and flared up into epidemic proportions during the fall of 1928, was responsible for much, if not all, of the increase in the death rate for the calendar year 1928. In the fall the epidemic was first reported on the Pacific coast, and it spread rapidly eastward, reaching its peak for the country as a whole about the first of the year 1929.

The disease in many parts of the country was so mild that physicians hesitated to report it as influenza, and many cases were considered to be merely severe colds and were not seen by physicians. However, the general death rate rose far above the normal during the epidemic, which did not continue for many weeks in any one place.

Surveys by the Public Health Service in certain States concerning the influenza epidemic of 1928-29 showed that the total number of cases of influenza and grippe, pneumonia, and colds per 100 persons canvassed for the several States was as follows:

San Francisco, 34.1; Seattle, 30.9; Kansas City, Mo., 27.1; Farmington, Mo., 37.7; Des Moines, 47.1; New Orleans, 29.6; Cincinnati, 27; Pittsburgh, 25.2; Baltimore, 15.1 (exclusive of colds not confining the patient to bed); Syracuse, 26.8; Boston, 23.5.

The average of all these localities except Baltimore was 29.7 cases of influenza, grippe, pneumonia, and colds per 100 persons canvassed. Nearly 15 per cent of the population canvassed in all localities surveyed in 1929 gave a history of having suffered attacks of influenza or grippe, while 0.47 per cent gave a history of pneumonia and an additional 14 per cent reported "colds" which may or may not have been directly related to the epidemic.

The incidence of pneumonia is shown to be about one-third as high in the epidemic of 1928-29 as in that of 1918. It is probable that the disparity between the two epidemics is greater than these figures would seem to indicate, since the periods covered by the 1928-29 record are generally longer than those covered in 1918. Moreover the 1918 epidemic occurred at a season when the prevalence of pneumonia is normally rather low, whereas the recent epidemic occurred at a season when the prevalence of pneumonia is normally rather high and increasing. Mortality records indicate a much greater disparity between the 1918 and the 1928-29 epidemics; apparently the cases in the latter epidemic were of a much milder type.

During the calendar year 1928, 38,000 cases of smallpox were reported in the United States. In 1927, 35,000 cases were reported. It seems strange that year after year more cases of smallpox are reported in the United States than in any other country of the world except British India. Yet this disease can be controlled by vaccination and revaccination and with the cooperation of the public could be stamped out in the course of a few years.

More cases of meningococcus meningitis were reported during 1928 than have been reported for any year since 1918. This disease appears to increase and decrease in cycles of several years' duration, and for at least five years it has been increasing. In 1926, 28 States reported 1,770 cases; in 1927 these States reported 2,263 cases; and in 1928, 4,146 cases.

The record for 1928 shows a new low death rate for typhoid fever. This disease was responsible for 34 deaths per 100,000 population at the beginning of the present century. The mortality has decreased until, in 1928, 43 States reported only 5,425 deaths, giving a death rate of 4.8 per 100,000 population. This reduction of 86 per cent in the death rate from typhoid fever has been brought about largely through the practical application of the principles of modern sanitary science, and health officers and others interested in sanitation who have had a part in the work may well be proud of the results accomplished. The figures show not only the saving of about 47,000 lives

in one year but the avoidance of an incalculable amount of human suffering and economic waste.

Tuberculosis is another disease which has been decreasing since the beginning of the century, when comparable annual records of deaths were first published. In 1928 the death rate from tuberculosis in 42 States was 77.5 per 100,000 population. This is the lowest general tuberculosis death rate ever recorded by the Public Health Service, although the 1926 death rate in the same States was only one point higher (77.6). In 1900 in the death registration area the death rate from tuberculosis was more than 200 per 100,000.

Another disease which showed a new low record for the year 1928 is diphtheria. The case rate for 43 States was 77.4 per 100,000 population, and the death rate was only 7.1 per 100,000. The death rate from diphtheria has been decreasing for many years. In 1900 it was 43.3 per 100,000 in the death registration area.

The number of deaths from pellagra in 43 States increased from 4,794 in 1926 to 6,652 in 1928. The death rates for 1928 range from 50 per 100,000 in South Carolina and 42 in Mississippi to less than one-tenth of 1 per 100,000 in several States. The disease is more prevalent in rural districts than it is in the cities, and Southern States have higher rates than Northern States.

During 1928, 36 States reported 4,405 cases of poliomyelitis (infantile paralysis) to the Public Health Service. This is about half the number reported for 1927 (8,933 cases), but it is nearly twice as many as were reported in 1926 (2,438 cases).

Experience in the United States has shown that throughout the greater part of the country it may be expected that about one paralytic case of infantile paralysis per 100,000 will occur between the 1st day of December and the 1st day of June each year and in the other six months about 4 to 14 cases. The maximum incidence, an average of two cases in three weeks per 100,000, is reached in mid September.

Ever since 1916, health officers have looked with especial concern on a definite rise of infantile paralysis during the month of June; but there have been several examples of a notable increase in reporting which was not paralleled by any such actual increase in incidence. In the warmer parts of the United States fewer cases occur, though the distribution follows about the same proportion by seasons as in the northern part. On the Pacific coast the rise appears to come a few weeks earlier and to reach a less abrupt peak somewhat later, with a relatively high prevalence maintained longer than is usual elsewhere. It would seem that other places which have a comparatively even temperature range throughout the year with a slightly retarded maximum would show the same characteristics.

Incomplete reports show that undulant fever (sometimes called Malta fever) is much more prevalent in the United States than had been realized. Reports from many sources, some of them not official, show that there were at least 649 recognized cases of undulant fever in the United States in 1928.

Four hundred and eighty cases of tularaemia with eight deaths were officially reported to the Public Health Service for the year 1928. Many cases of this disease are not reported.

Typhus fever is another disease for which the reports are incomplete. The mild form of this disease (sometimes called Brill's disease) was prevalent during 1928, especially in the Southeastern States; 143 cases with 12 deaths were reported to the Public Health Service.

PREVENTION OF THE INTRODUCTION OF DISEASES FROM ABROAD

No instance of the importation of any quarantinable disease has occurred during the year. Only three cases of smallpox reached our quarantine stations and were detained. No cases of plague, cholera, yellow fever, or typhus fever arrived at quarantine stations in the United States. However, in 10 instances during the fiscal year plague occurred on vessels arriving at foreign ports, and in April a vessel arrived at Glasgow from Bombay with 38 cases of smallpox on board, following which France imposed quarantine restrictions against persons coming from Great Britain. During the year there also occurred a severe epidemic of smallpox in Hong Kong which spread along the China coast. The preventive measures applied by Public Health Service officers at foreign ports of departure are reflected by the small number of quarantinable diseases on vessels arriving at United States ports.

At domestic ports during the year 19,529 vessels, 933,035 passengers, and 1,134,906 seamen were inspected on arrival by quarantine officers; at insular ports, 2,937 vessels, 138,947 passengers, and 203,182 seamen were inspected; and at foreign ports, 5,401 vessels, 544,127 passengers, and 366,762 seamen were inspected prior to embarking for the United States.

Of the passengers who embarked at European ports, 43,047 were vaccinated and 92,603 were deloused under the supervision of medical officers of the service. Clothing and baggage of these passengers amounting to 95,816 pieces were disinfected.

A total of 5,488 vessels were fumigated either because of the occurrence of disease aboard or for the destruction of rodents as a plague-preventive measure. Of the rodents recovered following fumigation, 17,888 were examined for evidence of plague infection.

Although but a small number of quarantinable diseases arrived at our quarantine stations during the year, there arrived, since November, 1928, at Pacific coast ports from the Orient a total of 21 vessels with 360 cases of meningococcus meningitis on board among the steerage passengers. The number of cases increased so rapidly as the winter season advanced that the available facilities at the command of the local health authorities at the ports of San Francisco and Seattle became overburdened, and at the request of the local authorities the Public Health Service extended the use of the facilities of the Federal quarantine stations at these ports to take care of the isolated cases and contacts in order to prevent the spread of the disease into the United States. By early spring the quarantine facilities of both the local and Federal health authorities were becoming overburdened, and the adoption of some other measure to prevent the spread of this disease into the United States became necessary, which resulted finally in the promulgation of Executive Order No. 5143 under date of June 21, 1929, having for its purpose the restriction and supervision of the transportation of passengers from ports in China and the Philippines to United States ports under regulations prescribed by the Secretary of the Treasury. Notwithstanding the more favorable climatic conditions of the summer season, cases of this disease continued to arrive at Pacific-coast ports, and it is probable that with the onset of another winter season only the strict enforcement of the provisions of the executive order and the regulations issued thereunder will meet the situation.

At the May, 1928, meeting of the health committee of the League of Nations at Paris, a commission on ship fumigation was appointed, of which the Surgeon General of the Public Health Service is chairman. The purpose of this commission is to make a detailed study of certain problems relating to the fumigation of ships by means of hydrocyanic-acid gas for the prevention of the introduction of plague. These studies are still in progress, considerable work of a research nature being accomplished at the New York Quarantine Station.

During the fiscal year the prevalence of yellow fever increased along the east coast of South America between the Amazon River and Rio de Janeiro, finally becoming so threatening as to result in an officer of the Public Health Service being detailed for duty in the American consulates at Buenos Aires, Argentina, and Rio de Janeiro, Brazil, in connection with measures designed to prevent the transportation of the infection by vessels destined for ports in the United States.

Three amendments to the quarantine regulations were promulgated during the year: The first, amendment No. 11, issued December 22, 1928, amended paragraph 2 of the Quarantine Regulations so as to exempt aircraft from foreign ports or ports in the possessions or dependencies of the United States from the necessity of obtaining bills of health except during the prevalence of quarantinable disease in such ports of departure or call. The second, amendment No. 12, issued December 26, 1928, amended paragraph 40 of the Quarantine Regulations so as to authorize quarantine officers to detain arriving cases of communicable but nonquarantinable diseases and persons having been exposed to such cases at the national quarantine stations when local health authorities do not have facilities for their isolation and care. The third, amendment No. 13, issued January 24, 1929, amended paragraph 37 of the Quarantine Regulations so as to permit the quarantine officer some exercise of discretion, within limits, respecting the heretofore mandatory muster of passengers and crews of certain vessels which carry a medical officer arriving in quarantine from ports classed as uninfected.

During the fiscal year several new international bridges were constructed across the Rio Grande along the Mexican border, resulting in increased quarantine and immigration activities at these ports. On this account it became necessary to open a new quarantine station at Thayer, Tex., on September 1, 1928, and one at Zapata, Tex., on April 1, 1929.

MEDICAL EXAMINATION OF ALIENS

At domestic ports 973,974 alien passengers and 984,771 alien seamen were examined by medical officers under the immigration law. Of this number 24,939 passengers and 1,951 seamen were certified for various diseases and disabilities coming under this law. The most important causes and number of certifications of alien passengers were: Trachoma, 590; tuberculosis, 195; feeble-mindedness, 137; insanity, 124; syphilis, 199; and gonorrhea, 674. Of alien seamen certified, 39 were for trachoma, 25 for tuberculosis, 269 for syphilis, 413 for chancroid, and 589 for gonorrhea.

The administration of the medical examination of arriving aliens along the Canadian border has been strengthened and extended, particularly east of the Great Lakes, in which sector increased facilities have been provided. The medical officer of the Public Health

Service attached to the United States Immigration Station at Montreal, Canada, in connection with the medical examination of intending immigrants, in addition acts as technical adviser to the American consul at that place.

There has been no material change during the past year in the system of making medical examinations of applicants for immigration visas in their countries of origin. The many advantages of this system of the examination of intending immigrants have been amply demonstrated during the four years in which the plan has been in operation. The policy of making medical examinations, on request of the consul, of entire family units accompanying heads of families who intend to emigrate to the United States leaving the family behind, has done much to eliminate criticism of immigration enforcement on the ground that it causes separation of families, as the admissibility of the entire family is forecast before the head of the family departs for the United States.

During the fiscal year ended June 30, 1929, a total of 173,740 applicants for immigration visas were given medical examination. Of the total examined, 17,847, or 10.3 per cent, were found to have mental or physical disabilities; 7,968, or 4.6 per cent of the total examined, were refused visas for medical reasons. Of 165,772 aliens who had been given a preliminary medical examination abroad and to whom visas had been issued, a total of only 22 were certified upon arrival at a United States port as being afflicted with class A diseases, resulting in mandatory deportation. The medical examination of aliens abroad is conducted in cooperation with the State Department and the Immigration Service of the Department of Labor.

PREVENTION OF THE SPREAD OF CONTAGIOUS AND INFECTIOUS DISEASES IN INTERSTATE COMMERCE

One case of human plague occurred in Monterey County, Calif., in July, 1928; another occurred in Santa Barbara County of the same State in August, 1928. Both cases were contracted from infected ground squirrels. The infection in these rodents extends over large areas in the central and coast counties of California, and the prospect of its eradication has not yet reached a hopeful stage. Control measures carried out by the horticultural commissioners in a number of California counties by means of poisoned grain have been more energetic and extensive than in previous years, but still fall short of the requirements for permanent improvement.

The 83 county health departments which were established in the area affected by the Mississippi flood of 1927 have been effective in averting outbreaks of disease which threatened to follow the wake of the flood. The success of this plan of work in meeting such an emergency has attracted the attention of health authorities in this country and abroad.

As a result of more than 15 years of experience in endeavoring to apply practical public-health knowledge to the community and the home, public-health authorities are agreed that the best results can be secured through the establishment and maintenance of efficient whole-time local health service in the rural sections where such work is most urgently needed. County health organizations provide the machinery through which all public-health activities may be conducted

in proper sequence and in proper relation one to the other, thereby insuring to communities a well balanced, comprehensive, and general program of public-health work well adapted to their needs. They also afford the best possible means for preventing the interstate and intrastate spread of disease.

During the fiscal year the Public Health Service cooperated in 204 counties in 17 States. At the present rate of progress, however, about 51 years will be required before all of the rural communities in the United States will be receiving adequate health service, the lack of which is now responsible for an annual economic loss of more than \$1,000,000,000.

Small trachoma hospitals, with an average capacity of 30 patients each, have been in operation at Rolla, Mo., Knoxville, Tenn., and Richmond, Ky., throughout the year. The trachoma eradication work has been facilitated by the establishment of several county health departments in trachomatous areas, where they have aided greatly in the location and follow-up of cases and have disseminated knowledge regarding the prevention and eradication of the disease.

Satisfactory cooperation has been received from State health departments, conservation commissions, and representatives of the shellfish industry in measures to insure the sanitary control of shellfish in interstate traffic. No outbreaks of disease due to infected shellfish have occurred during the year.

Routine measures for insuring safe water and milk supplies on trains and vessels engaged in interstate traffic have been continued with cordial cooperation from State and municipal health departments and railroad and steamship companies. Through this cooperative procedure a vast amount of work has been accomplished at very low cost to the Federal Government.

Supervision of sanitation in the national parks has been furnished at the request of the National Park Service as heretofore. This activity is of increasing importance as the number of visitors to the parks becomes greater each year and new areas are opened to the public.

The Twenty-Seventh Annual Conference of State and Territorial Health Authorities with the Public Health Service was held in the National Museum Building, June 3 and 4, 1929, and was attended by representatives of 34 States and the Territory of Hawaii. The conference was of unusual importance owing to the character of public health problems which were presented for consideration.

MEDICAL CARE AND TREATMENT OF MERCHANT SEAMEN AND OTHER AUTHORIZED BENEFICIARIES

The oldest function of the Public Health Service, namely, medical relief to American merchant seamen and other legal beneficiaries, has now been continued without interruption for 131 years. Relief stations were operated in 155 ports of the United States and its possessions, 380,442 persons applying for treatment or other medical services. More than 100,000 physical examinations not related to treatment and requiring a written report were made upon official request from various agencies, including the Civil Service Commission, Steamboat Inspection Service, Bureau of Pensions, Employees'

Compensation Commission, and the naval and military services. Twenty-two medical and dental officers and 101 part-time officers were detailed to furnish medical services to the Coast Guard on ships and at bases remote from relief stations. In cooperation with the Bureau of Prohibition, 9,070 certificates for medicinal liquor were issued to vessels. A total of 1,462,715 hospital patient days was provided in the marine hospitals and contract institutions and 741,103 out-patient treatments were given. All of the marine hospitals continue to admit patients of the Veterans' Bureau to the limit of their capacity.

The standards of hospital care in the United States have advanced very rapidly in recent years. To keep pace with the march of progress it is necessary to supply costly equipment, expensive to maintain, and requiring skilled personnel for its operation. The act of May 28, 1928 (Welch bill), increased the salaries of field personnel in aggregate amount \$322,660. For these reasons the per diem cost of hospital care has advanced to \$4.03 which, however, is considerably lower than that in private institutions furnishing accepted standards of treatment. A tabulated statement of the classes of beneficiaries and the amount and character of medical services furnished to each class will be found elsewhere in this report.

PREVENTION AND CONTROL OF VENEREAL DISEASES

The control of the venereal diseases still may be regarded as one of the most important public-health problems in this country to-day. From studies which have been made it is estimated that in spite of preventive measures which heretofore have been applied and the decrease in prevalence which must have taken place since the World War, there are constantly under treatment or observation by physicians and in clinics in the United States approximately 474,000 cases of gonorrhea and 643,000 cases of syphilis. It is also estimated that 697,000 cases of gonorrhea and 422,000 cases of syphilis seek treatment for new infections in the course of a year. The economic importance of the loss of earning power and the cost of medical care occasioned by these diseases can be readily appreciated. Moreover, this does not take into account the tragedy of gonorrheal blindness among infants, the serious (often fatal) pelvic infections which occur among innocent women, and the thousands of cases of insanity due to syphilis.

The Public Health Service has continued its efforts to reduce the prevalence of venereal diseases, through cooperation with State and local health authorities, the carrying on of educational work, and the conducting of research in problems related to the treatment and control of syphilis and gonorrhea. New activities undertaken include a number of additional prevalence surveys and an investigation of the syphilis problem among rural negroes in the Southern States. The campaign for prevention of venereal diseases among beneficiaries of the service was extended and expanded.

State health authorities reported a total of 195,559 cases of syphilis and 156,544 cases of gonorrhea. Clinics operated under State supervision reported 120,315 new patients and 2,128,417 treatments.

Cooperation with the Committee on Research in Syphilis (Inc.) and with the health section of the League of Nations in clinical studies of syphilis continued, and important progress was made in special researches carried on during the year.

NARCOTICS DIVISION CREATED

New duties and administrative functions continue to be imposed upon the service. A new division, known as the Narcotics Division, was created in the Office of the Surgeon General under the provisions of an act approved January 19, 1929. This legislation authorized the establishment of two institutions for the confinement and treatment of persons addicted to the use of habit-forming drugs. The new division is charged with the responsibility of managing these institutions, with the discipline, and with the methods of treatment for those admitted.

The functions of the Narcotics Division embrace but a small part of that large field of mental health, and its creation again illustrates the increasing tendency for diversification of service work. The widening scope of service activities calls attention to the necessity for enlarging the regular medical corps so as to permit of specialization in certain lines of its essential work.

INVESTIGATIONS OF PUBLIC HEALTH PROBLEMS

The research work of the Public Health Service was carried on during the fiscal year as in the past through the Hygienic Laboratory at Washington and through various field stations of a more temporary nature in different parts of the country. A number of subjects under investigation last year have proved to be extremely profitable and important fields for research and have been continued along lines suggested by previous results.

Although spotted fever of the Rocky Mountains is no longer the deadly menace which it used to be, thanks to the protective vaccine devised by workers of the Public Health Service, there is evidence that the area of its distribution is considerably wider than was formerly supposed, and the opening up of the country may be expected, at least temporarily, to increase the exposure of persons to this disease. By analogy with other diseases, the ultimate reduction and virtual disappearance of this condition may be expected as a result of the intensive occupation of the land by an increased population. But in the meantime, the abundant opportunity for continued study is offered in the fact that no means has yet been discovered for eradicating the disease from among the small animals which constitute the natural reservoirs of the infection. The manufacture and distribution of the preventive vaccine developed by the Public Health Service has been continued and increased, and the results apparently have been excellent. Studies have been made of the prevalence of the infection in nature, and laboratory studies of the reputed cause of the disease have been made, without, however, conclusive results. The amount of vaccine dispensed has been sufficient to vaccinate 5,000 persons, but as yet the returns following this use are not completely assembled.

The cancer studies of the Public Health Service have been continued both at a field station and at the Hygienic Laboratory. While no startling discoveries have resulted, some solid contributions to our knowledge of this disease have been made.

Milk investigations have registered a successful year. The standard milk ordinance recommended by the Public Health Service for communities to which it is adapted has been adopted in a large

number of additional communities and reports of its success, where sufficient time has elapsed for adequate observation, are practically unanimous. More milk, and of a much improved sanitary quality, is being consumed in those communities. A study of pasteurizing machinery has been brought to a point where publication is contemplated.

The epidemiological studies of trachoma and the laboratory study in the field have been continued.

Stream-pollution investigations, with headquarters at the laboratory in Cincinnati, have continued to yield very valuable results. This station is looked upon as a chief source in this country for information on underlying scientific principles relating to the effect of various kinds of pollution of streams and on the processes of natural and artificial purification which render the water susceptible of subsequent use for drinking purposes. A number of articles on the technical aspects of this subject have been published during the year.

Continued, if not increased, interest has been attracted to the malaria problem, due to the fact that for the first time in a number of years a definite increase of malaria has been observed in certain areas. Studies are under way to determine if possible the cause of this phenomenon and to devise means for preventing its recurrence. The use of Paris green for the control of malaria-carrying mosquitoes has been shown to have much wider application than was at first expected. Much work has been done on the application of this substance to breeding areas by means of inexpensive power hand blowers to be used either from boats or from the shore in connection with portable equipment which would come within the means of almost any community. Meanwhile the screening studies and the study of larvicides and new remedies for malaria have been continued with gratifying progress. Preparation was made for an extensive trial of the various methods of malaria control on a county-wide scale between two widely separated counties during the ensuing year.

The industrial-hygiene studies of this service have been prosecuted with good results during the year, including continued studies of tetraethyl lead gasoline, of occupational health hazards, of industrial poisons, and of industrial morbidity and mortality. Studies of daylight illumination by means of a special cabinet have been particularly unique and interesting.

The child-hygiene studies this year have been confined very largely to a statistical analysis of an immense bulk of material based upon defects and infectious diseases in a sample population of children. Studies of the vision of school children have been continued and a useful publication has been issued. The physical measurements of children of native white race stock, the age incidence of the common communicable diseases of children, and the relation between mental and physical status of children are additional topics concerning which publications are being or have been prepared.

Studies of the salt-marsh mosquito problem were brought to a close during the fiscal year and work is now being done on the final report. It is hoped that this will be of a fairly comprehensive nature embodying descriptions of the various kinds of breeding places of these mosquitoes, the enumeration of their species, habits, and distribution, an estimate of the extent of the problem, and a significant

contribution on the various means of control which have been found effective in various places and under different circumstances.

Goiter studies were discontinued during the fiscal year and a publication summarizing all of these studies by this service was prepared.

The four divisions of the Hygienic Laboratory have continued investigations of the problems in the basic sciences having relation to public health as well as of public health problems demanding immediate solution. Studies of nutritional diseases have continued to place their greatest emphasis on the subject of pellagra. The untimely death of Surg. Joseph Goldberger, whose notable discoveries have placed this disease on an entirely different scientific and practical footing, has not led to their discontinuance. Plans which he made for continued studies are being carried out faithfully with interesting results. Tularaemia, a disease much studied at the Hygienic Laboratory, has now been reported from 41 of the States and the District of Columbia, and from Japan and Russia. In addition to other known animal hosts, the muskrat and the opossum have been found susceptible and to have acted as sources of human infection. Undulant fever, as was indicated last year, has proved to be a disease of considerable public health significance. A medical officer has been assigned to the exclusive study of this disease, and it is hoped that nation-wide interest among public health authorities may be fostered which will serve to determine more exactly the significance of the infection and point the way for rational means of control.

Continued interest has been taken in the subject of typhus fever and several publications have been issued.

Complications connected with smallpox vaccine have received continued study. These have always been of such rare occurrence in this country as to have no invalidating influence on the general program of smallpox vaccination. Nevertheless, it has been possible through these studies to point out the means of avoiding a great portion of even these few cases. Pneumonia and poliomyelitis have also been studied at the Hygienic Laboratory during the past year.

Meningococcus meningitis (cerebrospinal meningitis) has appeared in a number of serious epidemics during the past year, during which the observation was made that the specific serum used for the treatment of this disease seemed to have very unequal or irregular results. This has led to a vigorous attempt at the laboratory to improve the therapeutic efficiency of these serums. This is an extensive undertaking, inasmuch as strains of meningococci must be selected from various epidemics and studied as to their pathogenic and immunizing properties. The Hygienic Laboratory continues to examine pathological specimens from the stations of the service.

The control of biologic products under the act of 1902 is centered at the Hygienic Laboratory and gives opportunity for a considerable amount of research work in addition to the routine work of testing specimens.

The Division of Zoology has issued or prepared for issuance a number of bulletins on the parasites of man and their relation to animal hosts. It also examines specimens suspected of containing animal parasites which are sent in.

The Division of Pharmacology has been engaged in (1) studies of a fundamental nature in connection with the cancer investigations of

this service, (2) studies of the pharmacological action of tuberculo-protein and ergosterol, (3) the correlation of chemical and functional changes in living tissue, and (4) the biological assay of ergot.

The work of the Division of Chemistry has included application of the specific tests for cysteine and cystine developed by this division, sugar researches, the preparation of a general review and bibliography of the subject of synthetic culture media, and the testing of arsenicals.

COOPERATION WITH OFFICIAL AND UNOFFICIAL AGENCIES

It has been the policy of the Public Health Service for many years to cooperate with various official and unofficial bodies in matters pertaining to the public health. Some of these cooperative activities are specially required by law and the remainder are necessary in the interest of efficient administrative methods. It is felt that there should never be lack of cooperation on the part of the Federal Government agencies where such cooperation is possible in the interests of efficiency in public health matters. This affords a means whereby duplication is avoided, expenses are reduced, and similar or related activities coordinated. The volume of cooperative work conducted during the fiscal year 1929 by the Public Health Service was extensive. It included practically all the departments and certain of the independent establishments of the Government. Among the more important cooperative activities of the service the following may be mentioned:

1. With the Department of State: In the medical examination of intending immigrants abroad for visa purposes, in the issuance of bills of health by American consuls and related quarantine matters, and in the medical treatment of destitute seamen returned from abroad.

2. With other branches of the Treasury Department in furnishing hospital care and medical and sanitary services to the United States Coast Guard, including retired personnel, and in the development of preventive measures against venereal diseases among seamen; in aiding the Bureau of Customs in the matter of violations of the quarantine act of February 15, 1893, and in issuing port sanitary statements to outbound vessels; also in standardizing and administering procedures required of aircraft arriving in the United States from foreign countries; in issuing permits to ships for medicinal liquor and narcotics; and in service on committees for the examination and disposition of narcotic drugs.

3. With the War and Navy Departments in the physical examination of applicants for the Officers' Reserve Corps and citizens' military training camps; in free medical and hospital services for civilians employed on vessels of the Mississippi River Commission, Army Engineer Corps, and Army transports; in treatment of officers and enlisted men of the armed forces (as pay patients); in the Mississippi-Warrior service in furnishing advice on distilling apparatus for treating water used on their barges.

4. With the Department of Justice in matters related to the protection of the interests of the United States in which the administration of the quarantine laws and regulations or the proper care and preservation of public property are concerned; in sanitary surveys of water and sewerage systems at penal institutions; in treatment of Federal prisoners detained in jails at certain ports.

5. With the Post Office Department by first-aid and special physical examinations; medical testimony in the suppression of frauds; inoculation of employees handling mails against typhoid fever and vaccination for smallpox; in a ventilation study of the substation post office at the Graybar Building, New York City.

6. With the Interior Department by cooperation with the Office of Indian Affairs in investigations of water and sewerage systems at the Indian jurisdictions, and in connection with the preparation of a minimum dietary standard for the children in the Indian schools in the United States; with the National Park Service in the supervision of sanitation in national parks and monuments, and in the maintenance of the Hot Springs venereal disease clinic; with the Bureau of Pensions in the physical examination of applicants for civil-service retirement and for military pensions.

7. With the Department of Agriculture by assisting in the enforcement of plant and animal quarantine; by cooperation with the Forest Service in the sanitation of national forests and watersheds; with the Food, Drug, and Insecticide Administration in the enforcement of the pure food law in relation to the adulteration of shellfish and in the prevention of the spread of typhoid fever through milk supplies in Montreal, Canada, and vicinity; by the loan of personnel for duty in connection with the encampment of the 4-H clubs; in the enforcement of the food and drugs act, with reference to the regulation of the maximum permissible content of sulphur dioxide in dried fruits and the standardization of ergot preparations.

8. With the Department of Commerce by aiding in standardizing and administering procedures required of aircraft arriving in the United States from foreign countries; with the American marine standards committee of the Department of Commerce in compiling specifications for the rat-proofing of ships; by physical examination and instruction and examination in the principles of first aid of applicants for license as ships' officers, at the request of the Steamboat Inspection Service; treatment of lighthouse keepers and seamen from vessels of the Lighthouse Establishment, Coast and Geodetic Survey, and Bureau of Fisheries; medical supplies to lighthouse vessels; physical examination of commercial air pilots; by collaboration with the American marine standards committee of the Department of Commerce in the preparation of specifications for ships' medicine chests; with the Bureau of Mines in clinical studies of syphilis at Picher, Okla.

9. With the Department of Labor in standardizing and administering procedures required of aircraft arriving in the United States from foreign countries; in the medical examination of arriving immigrants, and the medical examination of intending immigrants abroad; examination of immigrants in the United States and abroad and treatment of detained aliens.

10. With the Civil Service Commission in physical examination of employees and applicants for employment.

11. With the United States Shipping Board in the physical examination of crews and applicants for employment; in the examination of water samples taken from their vessels; in the development of preventive measures against venereal diseases among seamen.

12. With the United States Employees' Compensation Commission in the hospital and out-patient treatment of disabled Federal em-

ployees; physical examinations and special investigations; a permanent board of medical officers for disputed and difficult claims; medical assistance in carrying out the longshoremen's and harbor workers' compensation act and the District of Columbia workmen's compensation act; advice in regard to medical problems connected with compensation and hospital and out-patient treatment of injured Federal employees.

13. With the United States Veterans' Bureau in physical examination and hospital and out-patient treatment of patients.

14. With the office of Public Buildings and Public Parks of the National Capital in the sanitary inspection of Government office buildings in Washington.

15. With the Committee on Claims of the House of Representatives in the physical examination of subjects of special bills.

16. With various bureaus and independent establishments of the Government in the vaccination against smallpox and inoculation against typhoid fever of employees engaged in interstate travel.

17. With the International Office of Public Hygiene, Paris, and the Pan American Sanitary Bureau, Washington, D. C., in matters relating to maritime quarantine and the international exchange of information relative to the prevalence of quarantinable diseases.

18. With all States of the Union in the collection of morbidity reports and epidemiological data relating to communicable diseases.

19. With State departments of health in securing reports of cases of venereal diseases and compiling and publishing reports of State control and clinic activities.

20. With all States in the supervision and certification of water supplies used by common carriers in interstate traffic.

21. With various State and local health departments upon request by the testing of sera for the agglutination reaction as an aid in the diagnosis of undulant fever.

22. With various States and cities by responding to requests for advice and assistance in matters of milk sanitation control.

23. With Alabama, Connecticut, Delaware, Florida, Georgia, Louisiana, Maine, Maryland, Mississippi, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Texas, Virginia, and Washington in the investigation of shellfish growing areas and the development of local sanitary-control machinery.

24. With Alabama, Arkansas, California, Georgia, Idaho, Illinois, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Mississippi, Missouri, Montana, New Mexico, North Carolina, Oklahoma, South Dakota, Tennessee, Texas, Virginia, and West Virginia in cooperative demonstrations of county health work in 204 counties in these States.

25. With Florida, New Jersey, New York, and Indiana in the development of educational work in the prevention of venereal diseases.

26. With Florida, Massachusetts, North Dakota, Utah, and Texas by the detail of an officer during the year to assist in the development of plans for mosquito control activities.

27. With Kentucky, Missouri, and Tennessee in the maintenance of hospitals for the prevention and control of trachoma.

28. With Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont by the detail of an officer to advise with

them regarding the preparation of uniform legislation for the control of the sale of rabbits.

29. With Alabama and Virginia by the detail of an officer to study outbreaks of septic sore throat.

30. With Arizona and New York in the investigation of water-borne typhoid outbreaks at McNary, Ariz., and Olean, N. Y.

31. With Florida and Georgia by the detail of an officer to investigate endemic typhus.

32. With South Carolina and Tennessee in the conduct of a thyroid survey to determine the incidence of thyroid enlargement in those States.

33. With Alaska in the physical examination and vaccination of nonresidents of Alaska, especially persons employed in the Alaskan fisheries and canneries.

34. With Arkansas in cooperation with the Arkansas State Board of Health in the maintenance of the Hot Springs venereal disease clinic.

35. With Connecticut in the development of a division of industrial hygiene.

36. With the District of Columbia in cooperation with the District health department and the school authorities in the continuation of the study of the vision of school children.

37. With Georgia in a demonstration of the utility of the light power-dusting equipment developed by the office of malaria investigations for the control of the production of mosquitoes and in cooperation with the Georgia State Sanitarium in the treatment of pellagra patients.

38. With Hawaii in furnishing medical relief to leper patients.

39. With Illinois in connection with investigations of complications following vaccination against smallpox, and in the detail of a member of the scientific personnel to instruct regarding the collection, preservation, and examination of biological samples.

40. With Maryland by assistance in planning an antimosquito campaign in Somerset county.

41. With Minnesota by the detail of a sanitary engineer to make an examination of the Minneapolis water supply.

42. With Mississippi in the making of a venereal-disease prevalence survey.

43. With New York in the compilation of a spray-painting code and in the compilation of a code covering the hazards of rock drilling.

44. With Porto Rico in disaster relief work during the West Indian hurricane.

45. With South Carolina by the detail of officers to confer with the food research commission laboratory relative to chemical methods used in iodine determinations.

46. With Tennessee in a practical field check of the screening studies carried on in Lake County.

47. With Virginia by the detail of an officer to investigate at various times suspected cases of typhus, and in the detail of an officer to make observations regarding an outbreak of scarlet fever.

48. With Washington by a detailed survey of the public health activities and needs of the city of Seattle.

49. With San Francisco, Calif., and with the cities and counties in the vicinity of San Francisco Bay in rodent control and in the operation of the plague laboratory at San Francisco.

50. With the Canadian Health Department in the enforcement of Canadian and American regulations concerning water supplies used by foreign vessels operating on the Great Lakes and in shellfish sanitation work.

Cooperation has also been had with a number of societies engaged in public health activities, namely, the American Railway Association in the formulation of regulations concerning the sanitation of railway water supplies and coach-yard sanitation; the American Red Cross in disaster relief work in Porto Rico and Florida; the Rockefeller Foundation in the establishment of cooperative rural health work; the American Public Health Association in connection with a revision of the standard methods for the examination of water and sewage; the American Gas Association by membership on the advisory committee on warning agents; the American Standards Association by representation on a committee concerned with the formulation of safety codes for exhaust systems; the American Steamship Owners' Association and the Pacific American Steamship Association in the development of venereal disease preventive measures in the merchant marine; the American Social Hygiene Association in the making of venereal disease prevalence surveys; the American Merchant Marine Library Association in the distribution of venereal disease literature for seamen, and cooperation in the compilation of the Seamen's Handbook for Shore Leave; the American College of Surgeons in the collection of data on the subject of the recording of causes of death in hospitals; the Girl Scouts of the District of Columbia in making physical examinations of the girls who registered for attendance at the Girl Scouts Camp; with the International Commission on Zoological Nomenclature; the Illuminating Engineering Society by the preparation of the review of the current practice of the lighting of school buildings in the United States; the Leo N. Levi Memorial Hospital, Hot Springs, Ark., in treatment of indigent venereal disease patients; the health section of the League of Nations on clinical studies in syphilis; the National Research Council by membership on the committee on infectious abortion; the National Safety Council in the study of the health hazards in sand blasting; the marine section of the National Safety Council in studies and research in connection with ship fumigation; the New York Tuberculosis and Health Association in the investigation of the hazards of rock drilling in the New York City subway construction; the New York Tuberculosis and Health Association, the Welfare Council of New York City, and the American Social Hygiene Association in the study of the venereal disease problem among seamen at the port of New York; the Committee on Research in Syphilis (Inc.), in the development and coordination of syphilis research in the United States; the Missouri Social Hygiene Association in a venereal disease prevalence survey of St. Louis; and with the United Fruit Co. in the conduct of a study on the effect of plasmochin on the viability of malaria gametocytes.

Cordial cooperation has been maintained between the several divisions of the bureau. By this means advantage is taken of facilities, including hospital and laboratory, for the prosecution of the special work of a particular division.

Cooperative assistance has been received from a number of unofficial organizations and laboratories. Laboratory facilities and other valuable assistance have been furnished in connection with

service investigations of trachoma, cancer, leprosy, and industrial hygiene, by the following-named universities: Missouri School of Mines, Harvard, University of Hawaii, and Yale. In addition, the Public Health Service desires to acknowledge assistance received from the following agencies: Harvard Medical School, Missouri School of Mines, University of Hawaii, and the City of Greenwood, Miss., for laboratory space; the United States Navy, through the courtesy of its medical officers stationed in Hawaii, and the X-ray department of the medical school of Leland Stanford University in a roentgenologic study of the early bone changes in leprosy; the department of preventive medicine of Harvard University Medical School for collaboration in the cancer investigations with particular reference to the Rous fowl sarcoma; at the John McCormick Institute for Infectious Diseases and Cook County Hospital, Chicago, Ill., in a research project on gonorrhea. The cooperation rendered by these several agencies is hereby acknowledged. Through this means the conduct of important activities has been made practicable. This mutual relationship on the part of official and unofficial agencies is to be encouraged in the interest of public health research.

PERSONNEL

In the annual report of the transactions of the Public Health Service for the fiscal year 1928 attention was invited to the need of additional trained medical officers, due to the growth of service work over a period of several years past and to the extension of the medical examination of immigrants at consulates in the countries of origin. This need became acute during the present fiscal year. The Department of State has expressed a desire to extend the method now followed in Europe to 14 places in Canada and Mexico, and such extension can not possibly be accomplished until a considerable additional number of medical officers are available. The growth of the immigration work during recent years has been met only by taking from other important duties officers of proved qualifications, and as a result such work as scientific research and field investigations has necessarily been handicapped. As stated in the report for last year, the enlargement of the regular medical corps to an extent that will permit of the satisfactory discharge of these increasing activities is considered not only urgent for present needs but of paramount importance as related to future service work. If medical officers are to receive training and experience along special lines (and the field of public health work is becoming highly specialized), there must be a sufficient number of these officers to meet the constantly increasing work in certain fields, such as immigration and relief work, without taking from their duties officers who are engaged in important research, investigative, and survey operations.

Closely related to the problem of securing additional officers in the regular corps is the matter of compensation paid to these officers under present laws. The past fiscal year has witnessed more resignations from the regular corps than has any other year in service history. From June 30, 1928, until the end of the month of July, 1929, resignations numbered 16. Of this number, all but one were in the entrance grade of assistant surgeon. In addition to these resignations, three other young physicians who had taken and passed the

entrance examination subsequently declined their commissions. Not only have resignations increased, but it is becoming more and more difficult to secure qualified applicants to take the entrance examination. Three times during the year examinations were held in Washington, D. C., New Orleans, La., Chicago, Ill., and San Francisco, Calif. One examination was also held in New York City. Although all of these examinations were announced in medical journals and by notices sent to hospitals and medical schools throughout the country, only 39 qualified physicians appeared for examination. Of these 39, 19 were successful in passing.

In searching for the cause for the decreased number of candidates for commission, it becomes apparent that the compensation in the grade of assistant surgeon, which corresponds to that of first lieutenant in the Army, is not such as to attract medical graduates in large numbers. The total pay and allowances of an assistant surgeon with dependents are \$3,158 per annum. If he has no dependents, this compensation is reduced to \$2,699 per annum. It must be remembered that graduates of all acceptable medical colleges are now required to take a 2-year premedical course, followed by a 4-year course in medicine. In addition, the regulations of the Public Health Service require that an applicant must have had one year's hospital internship or two years of private practice following graduation in order to be eligible for examination. To take the examination and, if successful, to receive a commission with the compensation set forth above, the candidate must have spent a minimum of seven years in acquiring his professional education. Furthermore, there is no increase in this compensation for a period of four years, except for longevity pay of \$100 per annum at the end of three years' service.

It is not believed that the high standards set for candidates for commission, which include a rigid physical and oral examination in addition to the written professional examination, should be lowered. The compensation for those who are able to pass these examinations should, however, be increased to a figure that will compare favorably with what the well-qualified graduate can expect to earn almost from the beginning in private practice or in the many salaried positions now open to physicians in the field of industrial medicine.

It is desired again to invite attention to the necessity for authority to pay to commissioned officers actual and necessary traveling and subsistence expenses while on temporary duty away from their permanent stations. Under present laws mileage only can be allowed. An officer detailed temporarily to duty away from his permanent station may travel, for example, to a point 100 miles distant. Whether it is necessary for him to remain a week, two weeks, or longer, he receives in addition to his transportation \$10 in mileage for the round trip. It is obvious that an officer is thus obliged to pay the major portion of his expenses while on such duty out of his own pocket. As stated in last year's report, the resignations of several young officers have been due to inability to meet this expense when ordered to temporary duty in the field.

BUTLER BUILDING VACATED

During April, 1929, the four divisions of the Bureau of the Public Health Service located in the Butler Building, No. 3 B Street SE., were transferred to 16 Seventh Street SW., and established in the



The Butler Building, No. 3 B Street SE., occupied by the United States Public Health Service from June 11, 1891, to April 19, 1929

temporary structure designated as "C" Building, where the other four divisions of the bureau are located. The assembling of all the bureau divisions under one roof has proved to be of decided advantage from an administrative standpoint. The Butler Building was occupied by the Public Health Service from June 11, 1891, until April 19, 1929. This building was originally built by Gen. Benjamin F. Butler, and was completed in 1875. It is of interest to record here that President Arthur, who succeeded President Garfield following the assassination of the latter, made the Butler Building his abode for six months while completing arrangements to enter the White House.

RECOMMENDATIONS

The protection and promotion of the public health are of great importance to the Nation. This is true from several aspects, among the more obvious of which may be mentioned efficiency, economy, and national security. It is necessary, therefore, to recommend additional measures not only to prevent the introduction and spread of disease but to conduct studies relating to their cause, means of spread, and methods of prevention. Studies of public health problems are becoming increasingly complex. The following recommendations concerning the most important needs are submitted herewith:

LEGISLATION

Assignments of personnel from the Public Health Service to other branches of the Government have been made for a period of over 55 years and continue to be made at the present time. Whenever and wherever such details have been made, satisfactory results have been accomplished without friction and with a high degree of efficiency.

The highly specialized professional personnel of the Public Health Service is segregated into a compact unit for administrative purposes and is so organized that it can be drawn on for expert help whenever it is needed in any other branch of the Government. This plan of organization involves a minimum of expense and insures uniformity and accuracy of method. The further development of this system would place at the command of the Government one source from which each requirement for such service could draw and would obviate the building up of new professional units in the various departments at large overhead expense and with inevitable duplication of work and lack of coordination.

It is highly important from the health standpoint for this policy to be extended so as to apply to all agencies of the Government not specially provided with medical and sanitary services. The need to strengthen the health activities of the Government and to bring about their proper correlation has long been recognized. In order to insure the orderly development of Federal health work and to prevent waste, authority to this end should be established by law.

It is also recommended that consideration be given to the matter of securing legislative action to increase the compensation of commissioned medical officers. The need of such an increase, particularly in the entrance grade of assistant surgeon, is emphasized by the number of resignations which occur and by the difficulty in securing applicants with the required qualifications to take the entrance examination.

Legal authority to pay officers actual and necessary subsistence expenses, or a per diem in lieu thereof, when detailed away from their stations for temporary duty is needed.

SCIENTIFIC RESEARCH

The clearer understanding of the relative importance and scope of the studies which come within the purview of field investigations of public health gained during the year indicates the lines along which scientific research should be more profitably developed. Among the more important and urgent studies which should be undertaken are: Cancer research, investigations relating to industrial health, intensive studies of mental diseases from the standpoint of biochemistry and endocrinology, investigation of heart disease as one of the major causes of premature death, the further study of the epidemiology and prevention of undulant fever, and additional work on the several problems relating to child hygiene. To meet the constant increase in population and the growth of industry, the studies of stream pollution now being conducted should be extended.

The facilities at the Hygienic Laboratory should be increased to provide for additional studies of important problems relating to public health.

MARITIME QUARANTINE

New quarantine stations are needed at San Pedro, Calif., Tampa, Miami, and Jacksonville, Fla., and Corpus Christi, Tex., and rebuilding of the quarantine stations at Charleston, S. C., and Honolulu, Hawaii, is necessary.

The ports of San Pedro, Calif., Jacksonville and Miami, Fla., and Corpus Christi, Tex., have no facilities whatever for the housing of persons detained because of quarantinable disease or of the personnel and paraphernalia necessary for the conduct of quarantine activities. The maritime business of these ports, already large, is rapidly increasing, and it is imperative that adequate facilities be provided. A site for the quarantine station at San Pedro has been transferred from War Department lands to the Treasury Department, and as soon as harbor improvements now under way are completed, steps should be taken to provide proper facilities for the administration of the quarantine functions in that port. The transfer of lands from the War Department to the Treasury Department suitable for a quarantine station site at Miami is now in progress, following which proper facilities for the quarantine needs of the port should be provided as soon as possible.

The quarantine station at Honolulu was built over 20 years ago; it is of frame construction, and with few exceptions the buildings are in a bad state of repair and some are actually unserviceable, due in a large measure to the destructive attack of termites which infest that locality. New buildings of termite-resistant type should be provided immediately for the hospitalization of detained first-class passengers, steerage passengers, and oriental passengers. The present disinfection plant and pier, which are in the area required for proposed

harbor improvement and are in a poor state of repair, should be replaced at another location more suited to the proper operation of the station.

The quarantine station at Charleston was acquired from the State of South Carolina in 1908. It is of frame construction and many of the buildings, constructed over 40 years ago, are in bad state of repair and unserviceable. New hospital and disinfecting plant buildings, together with a set of quarters for the medical officer, should be provided immediately.

Because of the remote location of the present Tampa Bay quarantine station on Mullet Key at some distance from the ports it serves, the quarantine activities function with difficulty. In order to meet the demands of the enlarged and expanding commerce, the transfer of the station to a new site of approximately 30 acres on the mainland at Gadsden's Point has been strongly urged by local interests. The site proposed is conveniently situated and is available to the Government without cost. The plan has received the approval of all local civil and maritime organizations concerned in the development of the port and its commerce.

The rates of charges prescribed by the Secretary of the Treasury for quarantine services rendered at national quarantine stations, pursuant to the provisions of the appropriation acts approved April 17, 1917, and June 16, 1921, should apply also at the port of New York. The act of Congress approved June 5, 1920, transferring the quarantine operations at this port to Federal control prescribed that the schedule of fees and rate of charges in effect at the time of transfer should remain in force, and it will require legislation to correct this condition. Such enabling legislation should be secured at the earliest practicable date in order that these charges may be uniform at all quarantine stations, particularly in view of complaints which are being received of the marked discrepancy in the higher rate of charges for quarantine services rendered at the port of New York obtaining under the existing law.

There are some 70 quarantine vessels in service at the various quarantine stations in boarding and fumigation work. This is arduous duty and requires vessels specially designed for the work and of exceptionally rugged construction. The economic life of similar vessels in commercial practice is about 20 years and is based upon maintenance costing 10 per cent of original cost per year. Based upon 30 years' service, a fleet of 70 vessels requires the replacement of two vessels each year. During the last few years a fair start has been made in the matter of replacing this worn-out floating equipment. Six Diesel tugs, especially designed for quarantine work, have been built and two such boats are now in course of construction. Since being in operation, the saving to the Government by the use of these boats has been estimated to be in the neighborhood of \$2,000 per annum each in operating expenses as compared with the actual operating cost of the boats which they replaced. The proper maintenance of the quarantine fleet and the continuation of the building program already started will require annual continuation of increased funds now available for the purpose.

RURAL HEALTH WORK

The plan of applying practical public health knowledge to the people of our rural sections through the development of efficient whole-time county health departments is receiving wider interest and attention as its benefits and advantages become more generally recognized. There is no doubt that such local health organizations provide the machinery through which all public health activities may be conducted in proper sequence and relation one to the other, thereby insuring to communities a well-balanced comprehensive and general program of public health work well adapted to their needs. These health departments in doing their work also perform services of state-wide and nation-wide importance in the prevention of the intrastate and interstate spread of disease.

Farm organizations, health officer organizations, public health organizations, the National Congress of Parents and Teachers, and various other business and welfare organizations have expressed their interest and support of the principles of this work and their desire for its increase and extension.

MAINTENANCE, ENLARGEMENT, AND CONSTRUCTION OF MARINE HOSPITALS

To equip and operate the new and larger marine hospitals, some of which are now approaching completion, and to maintain the standard of hospital care demanded by the public, will, of course, require increased expenditures. Recommendations to this end will be made from time to time as progress is made with the building program which, in addition to the items outlined in the last annual report and now under consideration by the interdepartmental committee, should also include additions to enlarge the present marine hospitals in Chicago, Mobile, Key West, and Buffalo, and the new marine hospital in Detroit.

NARCOTICS DIVISION

The act of January 19, 1929, which created the Narcotics Division of the Public Health Service, does not carry the authorization that the officer in charge of this division shall while so serving hold the grade of Assistant Surgeon General. It is evident that this omission was an oversight in drafting the act. The duties and responsibilities of the officer in charge of this division are fully as important as those of the other officers who are assigned in charge of the several divisions of this bureau. It is recommended that legislation be obtained whereby the officer detailed by the Surgeon General to assume charge of the Narcotics Division shall while so serving hold the grade of Assistant Surgeon General.

COLLECTION OF REPORTS ON PREVALENCE OF DISEASES

The Public Health Service at present depends almost entirely upon the cooperation of State and local health officers for its information of the prevalence of communicable disease in the United States. The reports from different States are not comparable. Reports are incomplete and often not reliable. It is difficult in some cases for the Public Health Service to secure the necessary information for making reports to foreign governments required by the terms of the International Sanitary Convention of Paris, June 22, 1926, and the

Pan American Sanitary Code of November 14, 1924. It is desired to secure accurate information of cases of communicable diseases in time to enable health officers, Federal, State, and local, to take proper measures to prevent the spread of these diseases.

PUBLIC HEALTH EDUCATIONAL EXHIBITS

Each year a large number of requests are received by the Public Health Service from State and local health authorities, scientific associations, colleges, schools, and various other organizations for material that might be used for exhibit purposes in connection with the promotion of the public health. Research relating to the cause and methods of prevention of diseases affecting the public health is a proper function of the Federal Government. The advances made by such scientific inquiries can not be properly brought to the attention of health officers and others interested in protecting the public health unless provision is made for adequate dissemination of this information by exhibits and other means. There is great need of funds to provide exhibit material to meet the urgent requests for this purpose, and it is recommended that an appropriation be secured for such work.

PERMANENT BUILDING FOR BUREAU

With the transfer of all the divisions of the bureau to the temporary structure designated as "C" Building at No. 16 Seventh Street SW. there has been an improvement in the coordination of bureau administrative activities. However, the building which this bureau now occupies is a temporary structure erected during the World War and has many disadvantages. It is desired to renew the recommendation that a permanent, adequate, modern building be provided to house all of the activities of this bureau. A suitable building site has been approved by the Fine Arts Commission and is now available.

H. S. CUMMING,
Surgeon General.

Hon. A. W. MELLON,
Secretary of the Treasury.

DIVISION OF SCIENTIFIC RESEARCH

In charge of Asst. Surg. Gen. A. M. STIMSON

CANCER

During the fiscal year the cancer investigations have been carried on under the direction of Surg. J. W. Schereschewsky. The work of investigating the action of currents of very high frequency upon tissue cells was continued.

Improvements in apparatus.—Some improvements were made in the apparatus for generating high-frequency currents. The output of the apparatus was increased five to six times by adapting it for use with the UX852 tube, which is specially designed for short-wave work.

Minor improvements were also made in the details of the oscillating circuit. With this tube and the improved oscillating circuit it was possible to get satisfactory power output at frequencies well above 100,000,000 cycles per second, while at frequencies of between 90,000,000 and 100,000,000 cycles per second a current of over 5 amperes could be secured in a coupled circuit when this was carefully tuned to the oscillator frequency.

Effects of currents of very high frequency upon other transplantable tumors.—In the original report¹ on the effects of these high-frequency currents on transplantable tumors, mouse sarcoma No. 180, and (in collaboration with H. B. Andervont) the Rous fowl sarcoma were the test objects. The effect of these currents upon two other transplantable tumors was studied during the year, experiments being made with rat sarcoma No. 10 and the F1 mouse carcinoma. Both these tumors possess a high growth energy and show little tendency to recede in control animals, rat sarcoma No. 10, for instance, sometimes attaining a volume practically equal to that of the host.

It was found by using the method of application of these currents employed in the case of the mouse sarcoma that it was also possible to bring about the absorption of these tumors and the eventual recovery of the animal. In the case of the rat sarcoma No. 10 relatively large tumors were successfully treated in this way, some of them being 40 millimeters or more in their major diameters, with a weight estimated to be one-sixth to one-seventh that of the host.

Effects of change of frequency.—The original experiments reported¹ were conducted at a frequency of about 66,000,000 to 68,000,000 cycles. In the experiments with the other tumors, however, frequencies of 92,000,000 to 100,000,000 cycles were employed, because these were found to be more effective than the lower frequencies, the percentage of recoveries being higher and larger tumors proving

¹ Public Health Reports, Apr. 20, 1928. (Reprint 1222.)

amenable to treatment. A frequency of approximately 92,000,000 cycles was also found to be more effective against mouse sarcoma No. 180 than the frequency of 66,000,000 cycles previously employed.

Modification in exposure.—In the original experiments as reported, an exposure of three minutes with a current of 250 to 300 milliamperes was employed. Under these conditions the number of deaths following treatment and from intercurrent infections was considerable, successful results being obtained only in about 25 per cent of the animals experimented upon. The opinion was expressed that a lower current and a longer time of exposure would probably have produced better results.

This impression was erroneous, as it was subsequently found in conjunction with the higher frequencies that a considerable percentage of recoveries could be obtained in mice (60 to 70 per cent) by the use of a shorter time of exposure (60 to 90 seconds) with a higher current (350 for small and 400 milliamperes for large tumors).

Heating effects on tissues of currents of very high frequency.—In the report of the original experiments the statement was made that the application of these high-frequency currents to tumors apparently caused but little heating of the tissues. This statement was based upon the feel of the tumor immediately after treatment, the tissues being only slightly warm to the touch. In view, however, of the unreliability of tactile impressions, steps were taken to ascertain the actual degree of heating in tumor tissues when exposed to the action of these high-frequency currents. The degree of heating was measured by means of a Rawson temperature-difference meter. This apparatus consists of two pairs of thermocouples, the hot junctions being mounted in hypodermic needles of about 22 gage. The cold junctions are kept in crushed ice in a thermos bottle, while the hot junctions are inserted into the tissues the temperature difference of which it is desired to measure. A variable resistance in the apparatus permits the system of thermocouples to be brought into balance before temperature differences are measured. Then by inserting the first needle into one tissue and the second into another the temperature difference between them is indicated by the pointer upon a scale calibrated in degrees centigrade. The apparatus was used as follows: Immediately after the exposure of the tumor to the action of the high-frequency currents one needle was inserted into the tumor, while the other was inserted under the skin in another part of the animal as far away as practicable from the tumor. The scale reading then gave the difference in temperature between the subcutaneous tissues of the animal and that of the interior of the tumor. It was found with a little practice that the needles could be inserted in from 3 to 5 seconds after the termination of treatment. This method of observation was preferred to that of keeping the needle in situ during the treatment, because it was found that the presence of the metallic needle in the tumor distorted the field, and, furthermore, insertion of the needle in the electrostatic field was followed by considerable heating of the thermocouple in the interior of the needle due to the action of the high-frequency currents.

As a result of these temperature measurements it was found, contrary to the previous supposition, that the action of these currents caused a considerable amount of heating in the interior of the tumor. The average heating in 100 consecutive observations was 9.26° C.,

the maximum heating being 13° C. and the minimum heating 2° C., the time of exposure being 90 seconds and the current employed 350 milliamperes.

Some observations were made as to the thermal death point of the mouse sarcoma employed in these experiments. This was found to be between 48° and 49° C. with an exposure of 3 minutes. Since the average subcutaneous temperature of a mouse is in the neighborhood of 37° to 37.5° C., it is evident that the average temperature of the tumor at the end of treatment was approximately 46° to 47° C. It is therefore proper to assume, as at lower frequencies, that the heating effect of these currents of very high frequency plays an important part in devitalizing the tumor and causing its ultimate absorption.

While the basic action of these currents upon the tumor cells is doubtless thermic, there are two indications apparently which suggest the possibility of effects supplementary to thermic action. The first is the observation that in a number of instances recession of the tumor has been observed to take place when the temperature difference between the tumor and that of the other tissues did not exceed 6° to 7° C., a rise in temperature which does not of itself kill the tumor cells of this particular tumor in the short space of time (90 seconds) which the exposure lasted. The second is the observation, made, however, only in preliminary fashion, that after recovery following treatment with these high-frequency currents many animals are found to be resistant to reinoculation. This latter observation is more fully dealt with in a succeeding paragraph. In regard to the first observation, that recovery may take place when the degree of heating has been less than the known thermal death point of the tumor, the suggestion is made that at these very high frequencies heating effects may be due to dielectric loss in the affected tissues rather than to conductive resistance. Under these conditions, it is possible that here we have what may be termed a "spot-heating" effect; i. e., the cell is not uniformly heated, but some portion of it having a higher dielectric loss, such as the nucleus, may be raised to a temperature substantially higher than that of the rest of the cell. In this manner the *average* temperature of the tissues may well be below that of the thermal death point of the tumor cell, while, as a matter of fact, essential cell elements have been heated to a lethal temperature. Indeed, this suggestion is supported to some extent by the histological appearance of the tumor cells after treatment at frequencies of 92,000,000 to 100,000,000 cycles, in that the cell outlines appear to be but little altered, although the nucleus is profoundly changed, taking the stain deeply and uniformly and in typical instances losing all trace of nuclear structure. This is not in accord with the appearance of the tumor cells after heating in physiological salt solution to 50° C. Here sections show but little change in cell morphology. The nuclear figures are well preserved, the principal change noted being a tendency to deeper staining than in normal tissues.

Resistance to reinoculation.—Previous observers have reported that resistance to transplantable tumors may be brought about in laboratory animals in various ways. For instance, the preinjection of defibrinated blood, emulsions of embryo skin, organ emulsions, as of the spleen or liver, is followed, after a suitable interval, by resistance to tumor implantation. The use of living cells, however, is essential to obtaining this effect, as heated cells of tumor or other tissues are

devoid of immunizing action. Moreover, the methods just enumerated do not succeed in creating resistance against a transplantable tumor possessing the growth energy of mouse sarcoma No. 180. It is therefore of considerable interest to note that in a preliminary series of about 150 inoculations of mice recovered from this tumor by the action of high-frequency currents, about 50 per cent of them were resistant to the implantation. In a series of 20 rats which had recovered from rat sarcoma No. 10, 18 proved resistant to the reimplantation of the tumor, although there were takes resulting in rapidly progressive tumors in the case of 15, or 75 per cent of a similar number of controls. In the two recovered rats, which showed a positive result after reinoculation, in one the tumor after growing for about 10 days began to recede and eventually disappeared, though in the other animal the tumor showed progressive growth. These experiments, however, are preliminary and suggestive only, as the number of animals is insufficient on which to base conclusions, which are consequently reserved until this line of investigation has been further pursued.

Collateral studies.—In addition to the studies outlined above, collateral studies were begun during the year, but will not be reported in detail, as the results are still incomplete. They concerned the occurrence of immunity to the Rous fowl sarcoma in chickens after treatment with high-frequency currents (in collaboration with Dr. H. B. Andervont, of the department of preventive medicine and hygiene, Harvard Medical School), the heating effects of the high-frequency currents of different frequencies upon solutions of electrolytes of varying concentration, and the effects upon the isolated batrachian heart of a high-frequency electrostatic field. These collateral investigations have resulted in some interesting indications for investigation which it is hoped to pursue during the coming fiscal year.

GOITER

Goiter studies were continued, until their termination on April 30, 1929, under the direction of Surg. Robert Olesen. In view of the expected cessation of the work, attention was directed primarily to the utilization of material gathered during the preceding six years. It was also possible to undertake several special investigations.

Bulletin on endemic goiter.—During the period that the office of goiter studies has been in operation, a considerable amount of information has been accumulated. An abstract of this material has been prepared for publication and will be issued as Public Health Bulletin No. 192, entitled "Endemic Goiter."

*Distribution of endemic goiter in the United States.*²—By means of annual questionnaires addressed to health officers throughout the United States and the regular reading of current medical and popular literature, it has been possible to collect considerable data relative to thyroid surveys in this country. Originally reproduced in the Public Health Reports under the title "Distribution of Endemic Goiter in the United States as shown by Thyroid Surveys," these data have been revised and amplified through the receipt of additional information.

² Public Health Reports, Nov. 26, 1926. (Reprint No. 1125.)

*Endemic goiter and communicable diseases.*³—As a result of an extensive study in Cincinnati, it was concluded that there is some evidence to show that one of the immediate effects of communicable disease among girls of elementary-school age is simple enlargement of the thyroid gland. However, the enlargement is temporary in character. There appears to be no ground for assuming that communicable disease is responsible for simple goiter.

*Endemic goiter in Tennessee.*⁴—As a result of a thyroid survey of 10,811 boys and 14,316 girls in Tennessee, it was found that endemic goiter is more prevalent in the eastern section of the State. The condition is much more frequent among colored children, probably because of dietary peculiarities.

Endemic goiter in South Carolina.—At the request of State authorities interested in the subject, instruction in thyroid examinations was given to the directors of county health units and others. Test surveys showed that, although there is much less simple goiter in South Carolina than in the Great Lakes Basin, still the malady does exist to a demonstrable extent in this southern State.

Endemic goiter and physical exercise.—Until more accurate information becomes available, it appears unjustifiable to conclude that the program of physical exercise as customarily practiced in high schools is one of the exciting causes of simple thyroid enlargement. A study of 2,996 boys and 3,111 girls attending Cincinnati high schools failed to afford positive information on this subject.

LEPROSY

The Leprosy Investigation Station has been under the direction of Surg. N. E. Wayson, with Passed Asst. Surg. L. F. Badger executing the detail of medical relief of the patients at Kalihi Hospital.

The general policies of the station have been continued, in cooperation with the Territorial authorities, without important administrative or legislative modifications. The manufacture of the esters of chaulmoogra oil has been accomplished at the University of Hawaii by an employee of the service under supervision of the university authorities. In January, 1929, the Territorial board of health stopped drawing its supply of esters from the station.

The clinical aspects of leprosy, treatment of the patients, and administration of the medical activities in connection therewith continue to demand the greater portion of the time of the medical officers. It will be apparent that this is in large degree necessary and desirable under the present cooperative arrangement, in view of the number of patients resident at Kalihi and of the importance of maintaining individual contact with them, since the evolution of their condition and the efficiency of measures for their relief can only be thus determined, and because of the relation that the medical activities at Kalihi bear to the problem in the Territory.

Statistical data.—The statistical data relative to admissions and releases of patients at the Kalihi receiving station during the fiscal year are as follows: Patients remaining at the beginning of the year, 164; new admissions during the year, 62; readmissions because of

³ Public Health Reports, Nov. 16, 1928. (Reprint 1256.)

⁴ Public Health Reports, Apr. 12, 1929. (Reprint 1276.)

relapse, 22; transferred to Kalaupapa, 40; temporarily released, 26; deaths, 5. At the close of the fiscal year there were 177 patients remaining. There were two patients who were on temporary release status admitted for surgical treatment.

The following table records the racial distribution of the new admissions, and readmissions during the year:

Race	New patients admitted		Patients readmitted (relapsed)	
	Male	Female	Male	Female
Hawaiian.....	16	9	7	2
Part Hawaiian.....	8	8	4	1
Japanese.....	4	1	2	0
Chinese.....	3	1	0	0
Portuguese.....	1	1	2	2
Filipino.....	6	0	1	0
Korean.....	1	1	0	0
Porto Rican.....	1	0	0	0
American.....	0	0	0	1
German.....	0	1	0	0
Total.....	40	22	16	6

The number of new cases admitted is slightly in excess of that of the preceding year, and the number of readmissions is smaller, but the variations are not believed of significance in considering the curve of admissions over periods of several years.

Medical relief.—The medical relief furnished the patients by the officers of the station was as follows:

An average number of 73 in-patients were given 3,235 intramuscular injections of the esters of chaulmoogra oil, and an average of 30 out-patients were similarly given 744 injections; 42 patients were given 401 injections intramuscularly or subcutaneously with other drugs and oils; 4 were treated for four months by injections of foreign proteids; an average of 92 patients were given, orally, daily dosage of chaulmoogra or other oils; and approximately 41 patients were given 5,602 physiotherapy treatments; 8 surgical operations were performed and 5,026 dressings were done; 807 physical and 2,689 clinico-microscopical examinations were made. There were 6 obstetrical deliveries of 6 living children. Every patient is inspected at least once a week, and is completely examined, from the standpoint of leprosy, at least every three months.

Clinical studies.—Efforts have been continued towards determining the specificity of chaulmoogra oil therapy in leprosy. The ester derivatives of the oil have been administered intramuscularly and orally, and a small group of 20 patients have been given intramuscular injection of other unsaturated oils in combination with a small percentage of iodine. A second group of approximately 25 volunteers have been treated for nine months by having them eat a better rounded diet than is customarily provided for and consumed by them, with the addition of cod-liver oil administered daily by mouth. In so far as can be estimated in the brief period during which these control measures have been in effect there has been no definite evidence in favor of either scheme of treatment. Neither the incidence nor the degree of reactions (leprous fever) is correlated with the treatment. However, among those who develop a sharp local inflammatory

reaction to injections of the oils there appears to be a more prompt subsidence of the leprous lesions of the skin. This latter observation, together with other clinical observations, has led to attempts to speed up metabolism in a few patients by creating a low-grade fever experimentally.

Four nodular cases were treated by weekly intravenous injections of a standard bacterial vaccine for a period of approximately four months. Though a febrile condition, lasting 8 to 12 hours, was produced by each injection, it was not felt that either of the patients was materially improved. One nodular case, whose condition was relatively inactive, was treated by the administration of iodides in very small dosage. This therapy also induced sharp febrile reactions of 8 to 12 hours' duration, but without definite improvement in the patient's condition.

The oral administration of the esters of the chaulmoogric acids has been continued without any untoward effects. Very few patients seem unable to take a daily dosage of $2\frac{1}{2}$ to 3 cubic centimeters of the esters in 10 to 12 cubic centimeters of the emulsion over a period of several months. The effect of this emulsion as a laxative and as a stimulant to appetite has been remarked by a significant percentage of the patients, and a number feel that their general health is improved, which is entirely probable, since a large proportion of the patients consume a heavy carbohydrate diet and are of constipated habits. The cathartic action of the emulsion probably relieves this condition. No specific value of the remedy has been determined.

During the clinical study of 175 patients it was noted that over 23 per cent had glycosuria in a single specimen examined. This was in contrast to a little over 3 per cent with similar findings among 300 comparable controls. Other evidences of low tolerance to carbohydrates among the patients was found in their average blood-sugar concentration, which was 20 per cent higher than that of a control group, and in their abnormal reactions to a glucose tolerance test. The results of these observations were put into practice by reducing the carbohydrate intake of a group of patients and observing their reaction. The evidences of faulty carbohydrate metabolism were promptly diminished or suppressed, and in several patients the leprous condition seemed to improve more rapidly. The details and discussion of these observations are incorporated in a separate report.

Passed Asst. Surg. L. F. Badger finds that approximately 29 per cent of all the patients react positively toward either the Wassermann or Kahn serum test, or toward both, as opposed to 10 to 13 per cent among the selected cases in a local general hospital. He also finds that the average number of Kahn units is very much higher among the patients than among the luetics. Positive results among females and males is as 2 to 1. The degree of positive results in both the Wassermann and Kahn tests seems to be correlated with the clinical changes in the leprosy, without specific luetic treatments and without relation to chaulmoogra-oil treatments.

The cytology of the blood appears also to be correlated with changes in the leprous condition. This has not been definitely determined, since the investigation has been in progress too short a time. However, acute and subacute leprous progressions are apparently preceded by a rise in the absolute and relative number of leucocytes,

while retrogressions of the lesions are apparently immediately accompanied by a decrease in the leucocytes and an increase in the large monocytes, and, as convalescence progresses, by a decrease in both the leucocytes and monocytes with an increase in small lymphocytes. As clinical quiescence becomes established, these cells approximate more closely the numbers and ratios regarded as normal.

Through the courtesy of local United States naval medical officers, a Röntgenologic study of the early bone changes in leprosy has been initiated. This investigation is being carried on in cooperation with the X-ray department of the medical school of Leland Stanford University.

Laboratory activities.—The routine clinical microscopical examinations of patients and the manufacture of the emulsions and other experimental oil products were executed in the laboratory of the station. Investigations have been made of both human and rat leprosy.

A large series of rats inoculated with leprosy were fed a relatively high carbohydrate and unbalanced diet without definite effect on the development of the leprosy lesions, as contrasted with those of the controls fed on a mixed diet. This series has been under experimentation for two years, and the investigation has been conducted by using groups of 5 or 10 rats repeatedly under varying conditions with respect to the sanitary conditions of the boxes in which they were kept, the food provided, the isolation of the sexes and breeding, the strains of rats used, and to the two strains of rat leprosy.

Ten rats inoculated with rat leprosy have been treated by the intramuscular and subcutaneous injection of the esters of the acids of chaulmoogra oil, in dosages commensurate with those given to man, without any appreciable effect on the development of the disease. Similarly, a series was treated with potassium iodide without effect. Investigations were made of the effect of intramuscular and subcutaneous injections of medicinal dosages of the chaulmoogra esters on the blood-sugar concentrations of 10 leprosy and 40 normal rats, the latter divided into groups of 10, which were provided with different rations. The injections produced no apparent changes. Investigations of the calcium content of the blood of rats were likewise started, but discontinued because of the study which was in progress, a study of the absorption of the esters when injected subcutaneously or intramuscularly in rats. A dosage of one-twentieth cubic centimeter was injected into each of 40 rats and was readily detected as an encapsulated globule or was deposited in layers at or about the site of injection after periods of from 10 days to 6 months. These results were confirmed in a rabbit and two guinea pigs. Esters of other oils, oils, and fatty acids were similarly injected into rats, in groups of five, and in all the animals the fatty substances were readily detected in encapsulated, emulsified, or layered deposits after periods of from 7 to 40 days. In one human case the esters of the acids of chaulmoogra oil were easily recovered in the gluteal fascia of one side in droplets three weeks after injection and readily observed in the fascia of the other side in layered deposits one year after injection. An attempt was made to detect the esters in patients under injections, by Röntgenology, but without result. This was probably due to the permeability of the oil to the X ray, because

of the very low (one-half of 1 per cent) iodine percentage. This study was also accomplished by the assistance of the United States naval medical officers above mentioned.

The effect of the sodium soap of the acids of chaulmoogric oils on the bacillus of rat leprosy is being studied further, since in a preliminary experiment the exposure of a suspension of this bacillus to a 2 per cent solution of the soap had no apparent effect on the subsequent production of rat leprosy lesions upon injection of the suspension washed free from the soap.

Cultures of bacteria of the morphology of diphtheroids, whose staining characteristics, when cultivated on special media, are those of an acid-fast organism, have been obtained on several occasions from the blood of human cases of acute leprous fever and from the lesions of rat leprosy. The relationship of these organisms to leprosy is undetermined.

On four occasions during the year a leprouslike granulomatous condition has been obtained in white rats at the site of injection of bacillus-bearing material from human cases. In two instances the condition was reproduced in a second series of rats at the site of injection, and in one series injected intraperitoneally nodules were developed in the omentum with an inoculum obtained from the granulomata developing in the first rat series. However, a third transfer of these secondary reproductions was not attempted because of the paucity of the organisms in the lesions, and because of previous failures under like circumstances. The tissue reactions obtained suggest those of a low-grade infection with a tendency to healing, rather than those of an active or progressive process.

MALARIA

Surg. L. L. Williams, jr., continued in charge of the malaria investigations, with headquarters at Richmond, Va.

Screening studies.—The special screening studies in Leflore County, Miss., have been completed. Acting Asst. Surg. C. P. Coogle has taken the last blood index, has reinspected the 500 screened and the 500 unscreened homes, and has commenced analysis of the data for final report. This will soon be ready for publication.

A practical field check testing this method of screening has been carried on in Lake County, in western Tennessee, in cooperation with the Tennessee State Department of Health and the county health department. The local officials have received training and assistance from the Public Health Service, and they have been able to screen approximately 60 per cent of the homes in the malarious section of the county. A blood index was taken before screening, and indices will be taken each year for at least two years.

The method of screening developed by the Public Health Service has been adopted in practically every malarious State of the South. During the period from March 1 to June 30, 1929, four counties in four States have successfully screened 1,656 homes.

Dust studies.—The most important studies this year were in connection with the distribution of Paris green in the control of the production of *Anopheles quadrimaculatus*. These studies were carried on largely at Reel Foot Lake, Tenn., under the immediate supervision of Senior Sanitary Engineer J. A. LePrince, who was

assisted by Technical Assistant in Sanitary Engineering H. A. Johnson. The equipment used in the studies consisted of a very small and very light gasoline-operated electric generating outfit supplying the current for an electrically driven dust gun which is so light that it can be used by hand. Dust was taken from a simple hopper and blown through the dust gun, creating an excellent dust cloud. The apparatus was loaded into a small skiff operated by an outboard motor. A hydroglider with airplane motor and propeller was first tried, utilizing the air blast from the propeller for the distribution of dust. Before the season was over, however, the lighter outfit described above had been developed, and it was found that it gave a better dust cloud; that experiments could be carried on at the same boat speeds; and that instead of a total cost of \$3,000 the lighter outfit could be purchased for less than \$500. The smaller apparatus can also be operated at less than one-twentieth the hourly cost of the hydroglider.⁵

While these experiments were under way the field force tried out the various forms of hand-power dust guns that have been used by other workers throughout the world during the past few years. They have been found to be useful as adjuncts to the power duster.

With the development of the light power dusting unit and utilization of hand-power distribution a method of mosquito control has been devised which is practicable even in the poorer rural counties. There is now being undertaken in Dougherty County, Ga., in co-operation with the State department of health and the county health department, a demonstration of the utility of this method in the control of the production of mosquitoes on a county-wide basis. Epidemiologist T. H. D. Griffiths is in immediate charge at Albany, Ga., and is assisted by Sanitary Engineer W. H. W. Komp. Funds are largely supplied by Dougherty County and the effectiveness of the work is being studied by the Public Health Service. At the end of the fiscal year the equipment had been secured, and control operations were well under way. A spring blood index was taken and the malaria rate found to be a little over 33 per cent, mostly estivo-autumnal. At the end of the season another index will be taken. Indices will be repeated each year for the next two or three years. Even if the transmission of malaria is stopped during the present summer, the true reduction can hardly be measured before the autumn of 1930, as the relapses of present cases should hold the rate to a high figure for at least one year.

Soon after starting the continuous county-wide dusting in Dougherty County, Ga., a corollary experiment was begun in Dyer County, Tenn., using intermittent dusting. This is under the direct supervision of Senior Sanitary Engineer J. A. LePrince, assisted by Technical Assistant in Sanitary Engineering H. A. Johnson and two student assistants. These two studies are similar, with the exception that in Georgia the dustings will be sufficiently frequent to keep down *Anopheles quadrimaculatus*, while in Tennessee the dustings will be only once a month for July, August, and September, and there will be from time to time a number of *Anopheles quadrimaculatus* present. The object of the Tennessee study is to determine whether these dusting periods are sufficient, so that *Anopheles quadrimaculatus* on

⁵ Public Health Reports, Apr. 26, 1929. (Reprint 1280.)

the wing will not be present after they have developed sporozoites in the salivary glands. This west Tennessee study should indicate the minimum number of dustings necessary and thus establish the minimum amount of Paris green required for a given area of breeding surface. In this work the economics of mule-back dusters and various forms of transportation for power dusters are also being tested.

In addition to the above studies, various members of the field force are continually experimenting with different apparatus and methods of distribution of dust clouds, with the ultimate aim of cheapening the cost of control work. Every reduction in unit costs expands the sphere of malaria control.

Biological studies.—The principal biological study commenced last year by Special Expert M. A. Barber, with the assistance of Sanitary Engineer W. H. W. Komp, was in the nature of a preliminary study of the use of plasmochin in the treatment of malaria.⁶ This study was completed in Almirante, Panama, during the past winter, in cooperation with the United Fruit Co. Barber and Komp found that very small doses of plasmochin, when given to malaria patients in conjunction with quinine, very promptly destroyed the ability of the human carrier to infect the mosquito. They found that the administration of only one-half centigram to a malaria carrier prevented infection of all *Anopheles* subsequently fed upon that carrier. Before administration of plasmochin, all *Anopheles* that fed on this carrier became infected.⁷ According to these findings, if small doses of plasmochin could be introduced into the diet of all the people living in the malarious sections malaria would disappear.

In addition to the biological studies carried on at the malaria research laboratory at Greenwood, Miss., studies have been continued on the dissection and mounting of mosquitoes and the feeding and breeding habits of *Anopheles*. The conclusions reached in these studies have been published in the Public Health Reports.

Studies on the effect of various poisons in combination with a non-volatile oil were commenced in the vicinity of Williamsburg, Va. These studies were under the supervision of Entomologist A. F. Doff, assisted by Scientific Assistant P. H. Picot.

In addition to the investigations reported above, members of the malaria field force have, from time to time during the year, been detailed to special malaria and mosquito studies upon requests from the State health officers of Florida, Massachusetts, North Dakota, Utah, and Texas. In several of these States, through this assistance, organizations have been developed, both official and unofficial, which have commenced state-wide work looking toward the ultimate control of the production of mosquitoes. Mosquito districts have been formed in Utah, on the Gulf coast, in Georgia, New York, and in Massachusetts. Great enthusiasm has been aroused in the resort sections and good work has been started which will ultimately remove the mosquito from the playgrounds of the country.

Salt-marsh studies.—The salt-marsh survey of the Gulf and South Atlantic States in connection with the breeding of the salt-marsh

⁶ See United Fruit Co.'s Annual Report for 1928.

⁷ Public Health Reports, June 14, 1929. (Reprint 1290.)

mosquito was completed at the end of the fiscal year. These studies were under the supervision of Epidemiologist T. H. D. Griffiths and will be found in a separate report on page 53.

NUTRITIONAL DISEASES

The field studies in nutrition during the fiscal year 1929 were, as for a number of years past, carried on both at the Hygienic Laboratory, Washington, D. C., and at the Georgia State Sanitarium, Milledgeville, Ga. The work at both stations was under the direction of Surg. Joseph Goldberger until his death on January 17, 1929. After that date the studies at the Hygienic Laboratory were conducted by Asst. Surg. W. H. Sebrell, and at the Georgia State Sanitarium by Surg. G. A. Wheeler.

The studies at the Hygienic Laboratory were a continuation of the program inaugurated by Surg. Joseph Goldberger and consisted of (1) tests of individual foodstuffs in the dog and, to a less extent, in the albino rat, to determine their probable pellagra-preventive value; (2) a test of the antineuritic and P-P potency of various food substances and concentrates in the albino rat; (3) an attempt to produce pellagra in the monkey.

During the year, tests of the blacktongue preventive potency of casein, green peas, salt pork, and lard were completed. The results indicate that these substances contain very little, if any, of the P-P factor. Tests of rice polishing, haddock, Irish potatoes, and sweet potatoes were in progress at the close of the fiscal year. With the rat, attention has been directed primarily toward the development of a more rapid method of determining the presence of the antineuritic and pellagra-preventive factors of the vitamin B complex. The studies in the monkey consist of feeding a pellagra-producing diet and were still in progress at the end of the fiscal year.

A report of the epidemiological study of pellagra in 24 cotton-mill villages of South Carolina was prepared by Surg. Joseph Goldberger and has been published as Hygienic Laboratory Bulletin No. 153.

At the Georgia State Sanitarium the study (in the human) of the pellagra preventive potency of individual foodstuffs was continued as planned by Doctor Goldberger. Tests of casein and canned salmon were completed during the fiscal year. The study of canned haddock, begun during the fiscal year 1928, was continued on an enlarged scale during the fiscal year 1929 and is in progress at its close. The study of the heat resistance of the pellagra-preventive factor by the use of autoclaved yeast in feeding experiments, begun during the year, is still in progress.

ROCKY MOUNTAIN SPOTTED FEVER

Under the direction of Surg. R. R. Spencer, studies of Rocky Mountain spotted fever and of associated problems have been continued at the Hygienic Laboratory in Washington, D. C., and at the Public Health Service field station at Hamilton, Mont. (in the Bitterroot Valley).

Three principal lines of work have been followed: (1) The manufacture and distribution of the Public Health Service vaccine for the prevention of Rocky Mountain spotted fever, which has now been in use for five years; (2) epidemiological studies relating to the occur-

rence of human infection and to the study of spotted-fever virus in nature; (3) laboratory investigation of the etiologic agent, with special efforts to culture the organism on artificial media and to investigate further the Weil-Felix reaction in Rocky Mountain spotted fever.

PREVENTIVE VACCINE

Manufacture.—The improved facilities now available have made possible an increased production of vaccine. A total of 25.2 liters were prepared, which is double the amount of any previous year. Better methods of manufacture have resulted in a more nearly standard product with an increased average potency; while losses from contamination, formerly rather frequent, were entirely absent. The cost of preparation has also been materially reduced.

Distribution and use.—Although the season is not yet completed, more than 20 liters of vaccine have been distributed to over 300 physicians in the States of Montana, Wyoming, Idaho, Washington, Oregon, Nevada, California, Utah, Colorado, South Dakota, and New Mexico. It has been supplied directly to physicians upon request, except that in Wyoming distribution has been made to advantage through the State health department and the county health officers.

Complete returns are not yet available, but the quantity dispensed has been sufficient to vaccinate 5,000 adults—more than the combined total of the four previous seasons.

Demand.—Each season, since the first use of vaccine, has brought an increased demand. A still further increase is expected in 1930, and a production of 35 liters is planned.

Results.—In the Bitterroot Valley in western Montana the use of the vaccine against the most virulent type of spotted fever has been carefully checked for five seasons. During that period 20 cases and 17 deaths (85 per cent mortality) have occurred in nonvaccinated persons. Among those vaccinated, on the other hand, there has been only 1 death among 12 clinically recognizable cases (8.33 per cent mortality). Several suspected cases, presumably aborted by vaccination but so mild that definite diagnosis could not be made, have also occurred in the vaccinated group. In another area of virulent infection in Wyoming two vaccinated persons have been the only recoveries during the several years for which records are available.

The vaccine has also been widely used in areas where mild types of infection with low death rate usually prevail. In such sections—in one of which controlled observations have been made—only one case has occurred among those vaccinated.

Five years' data suggest that against highly virulent strains a sufficient degree of protection is commonly conferred to cause a striking amelioration of the grave clinical manifestations and to insure recovery, and that against the very mild types, full protection is usually afforded.

EPIDEMIOLOGICAL STUDIES

Two new areas of extreme virulence and high mortality have been revealed in Wyoming—one in Hot Springs, the other in Fremont County. There is also evidence that in areas of usually mild infections, the local strains may occasionally assume exceptional virulence. Reports thus far received indicate that this has happened in a num-

ber of widely scattered areas in 1929, with resulting abnormally high local death rates.

Under the direction of Special Expert R. R. Parker, ecological investigations of spotted fever in nature have been resumed, having been discontinued in 1924 to permit concentration on vaccine studies. Their general purpose is to secure more knowledge of the conditions in nature responsible for the maintenance and perpetuation of infection. The major problem at present is a field and laboratory study which it is hoped will reveal the factors responsible for the well-known regional variation in virulence. The recently demonstrated presence of an extremely mild nonsymptom producing type of spotted-fever virus in ticks on the east side of the Bitterroot Valley (hitherto supposed free from infection), as opposed to the highly virulent west side infection, permits an intensive comparative study of the problem concerned in areas easily accessible from the Hamilton station. It is expected that observations must be continued through several seasons to yield data of value.

The results of investigations of the disease during a period of six years have been compiled in a Hygienic Laboratory bulletin and submitted for publication.⁸

TULARAEMIA

Tularaemia studies have disclosed two additional possible sources of human infection not hitherto suspected: Quail, commonly hunted as game birds, have been found susceptible; and *Bacterium tularense* has been recovered from wild ticks of the species *Dermacentor occidentalis*, which is a frequent parasite of man on the Pacific coast.

Studies of tularaemia as a possible agent in the decimation of game-bird populations have been continued in cooperation with the Bureau of the Biological Survey and Dr. R. G. Green, of the University of Minnesota Medical School.

EPIDEMIOLOGICAL STUDIES OF TRACHOMA

The field investigation of trachoma under the direction of Passed Assist. Surg. A. S. Rumreich was resumed in Miller County, Mo., in June, 1929. In November field work was commenced in Shannon County, Mo., an area located well within the heart of the Ozark Mountain region, and in which more acute manifestations of the disease had recently been noted.

This work was interrupted somewhat by the detail of the medical officer to assist in the influenza survey. It was resumed, however, early in May, 1929, and is now being intensively pursued. The scope of the investigation embraces environmental, dietetic, and genealogical factors. The work is carried on in close cooperation with the trachoma eradication activities.

ADMINISTRATIVE HEALTH PRACTICE

The office of administrative health practice has been continued in charge of Surg. Paul Preble.

The facts set forth in the numerous public health surveys conducted by the Public Health Service have served to emphasize the urgent

⁸ Studies on Rocky Mountain Spotted Fever. Hygienic Laboratory Bulletin 154.

need of further intensive study of each important function of both State and municipal health departments in order to determine the basic principles essential to modern public health practice. Attention has been directed during the past year to a critical study of the details and problems concerned with the control of communicable disease and vital statistics. Such studies, applied to each important health activity, and supplemented by personal experience with conditions of practice as found in representative States and cities, should make it possible to arrive at rather definite conclusions concerning fundamental and essential principles of public health administration that will conform to our present knowledge of preventive medicine and hygiene.

The records and data collected in this office have made it possible to develop a bureau of information through which it has been possible to supply health officials and others with detailed information concerning various problems in public health practice and matters affecting the public health. A review of the inquiries now being received in increasing numbers indicates the need of further developing the resources of such a bureau of information.

At the invitation of the commissioner of health, supported by a special resolution of the public health committee of the Chamber of Commerce of Seattle, Wash., a detailed survey of the public health activities and needs of that city was carried on during the months of May and June, 1929. It was found that out of a very considerable appropriation allotted to the health department only a relatively small expenditure could be charged to essential health service, the balance being required to operate and maintain a city hospital and dispensary, a tuberculosis sanatorium, and an extensive garbage, disposal system.

CHILD HYGIENE INVESTIGATIONS

During the first three months of the fiscal year the activities of the child hygiene office were under the direction of Surg. Grover A. Kempf. For the remainder of the year the work was in charge of Acting Asst. Surg. E. Blanche Sterling. Much time was spent in statistical work on the valuable and extensive original data on the physical status, growth, and development of white school children, which had been procured in a field investigation completed in the preceding fiscal year. In addition, the activities of the office included studies of (1) the vision of school children; (2) cooperative studies in (a) physical measurements of children of native white race stock; and (b) the age incidence of common communicable diseases of children; (3) mental and physical status of a group of school children in Illinois; (4) milk feeding of children; and (5) acute rheumatism in childhood.

VISION OF SCHOOL CHILDREN

The study of the vision of school children in the District of Columbia, in cooperation with the department of health and the District school authorities, was continued under the direction of Acting Asst. Surg. Bernard L. Jarman.

During the fiscal year ending June 30, 1929, 1,094 children were examined. In addition to the usual tests for visual acuity, examination of the fundus, and measurements to determine the length of the eyeball, two extra features were added to the examination, namely, the determination of the master or sighting eye and the interpupillary distance.

At the present stage of the investigation it is especially desired to study any changes which may occur in the eyes of growing children, and therefore emphasis is being placed on reexaminations of children whose eyes were examined early in the study. In the past year 209 children were examined for the second time and 56 for the third time. It is expected to place added emphasis on these reexaminations in the next fiscal year.

During the past fiscal year two papers were published based on an analysis of the data obtained in the first three years of the investigation.^{9 10}

PHYSICAL MEASUREMENTS OF CHILDREN OF NATIVE WHITE-RACE STOCK

This study of the children of "old American" stock, carried out with the cooperation of the office of statistical investigations, was planned by Senior Surg. Taliaferro Clark, the data was collected by medical officers connected with the child hygiene office, and the analysis of the data was made by Associate Statistician Selwyn D. Collins. The children studied were native white children with both parents and all four grandparents born in the United States. Heretofore practically all studies of measurements had been made without regard to the nativity or race stock of the parents, and it is obvious that all races are not of the same physical type. Hence it seems desirable that children of specific race stocks should be studied in order to avoid the error of applying a possibly false and arbitrary standard to individual children.

The standing height, trunk length, chest circumference, width and depth of chest, and vital capacity of "old American" children were taken in the Northeast, North Central, South Central, and Western States. It is felt that these studies of the relation of race to growth and development will be a worth-while increment to the anthropological studies in child hygiene.

AGE INCIDENCE OF THE COMMON COMMUNICABLE DISEASES OF CHILDREN

This statistical study by Associate Statistician Selwyn D. Collins, in cooperation with the office of field investigations in child hygiene was completed in the past fiscal year.

The diseases studied included measles, whooping cough, mumps, chicken pox, scarlet fever, and diphtheria.

It was found that the maximum incidence varies from about 3 years for diphtheria to about 8 years for mumps. After the maximum is reached the rates in every case decline rapidly as age increases.

The diseases of childhood are of great importance. Measles and whooping cough, though not usually looked upon with great concern by parents, occur in such large numbers that, despite the small

⁹ Public Health Bulletin 182.

¹⁰ Public Health Reports, July 6, 1928. (Reprint 1235.)

fatality rate, together they cause as many deaths as diphtheria. It will be readily seen, therefore, that a knowledge of the ages when children are most likely to contract such diseases is of great importance from the standpoint of prevention.

THE RELATION BETWEEN MENTAL AND PHYSICAL STATUS OF CHILDREN IN TWO COUNTIES OF ILLINOIS

This study is based on a joint investigation made by the Public Health Service and the Illinois State Department of Public Welfare.

Approximately 5,000 children were examined both physically and mentally, the physical examinations being made by medical officers of the United States Public Health Service, and the mental examinations by psychologists and other trained personnel of the Illinois State Institute for Juvenile Research. In analyzing the data obtained special attention was given to the following features:

1. Relation of intelligence quotient to school progress and other similar factors.

2. Variation in intelligence quotient in different groups.

3. Relation of intelligence quotient to physical defects.

4. Relation of intelligence quotient to physical growth.

There seemed to be considerable correlation between the intelligence quotient and school progress and similar factors.

Race, color, nativity, language used in the home, occupation of the father, age and place of residence of the child, all seemed to have some relation to the intelligence quotient of the child. It appears from this study that the intelligence quotient is an indication of the child's total present mental equipment rather than of his "native" intelligence, apart from his training and experience.

The average number of physical defects decreased as the intelligence quotient increased. This tendency seemed to be independent of race, language, and other similar factors. Among the children of native white parents, in whom a possible relation of specific defects with intelligence quotient was studied, no particular defect, with the possible exception of defective hearing, stood out as having a particularly close relation to the intelligence quotient. The relationship between intelligence quotient and physical defects appears to be of a general rather than a specific nature.

The mean measurements of the group of children with intelligence quotient above average are slightly greater than the mean measurements of those below average.

THE MILK FEEDING OF CHILDREN; ACUTE RHEUMATISM IN CHILDHOOD

Studies on the milk feeding of children and acute rheumatism in childhood were made by Acting Asst. Surg. E. Blanche Sterling for the Office International d'Hygiene Publique at the request of Senior Surg. Taliaferro Clark, the service representative in Europe.

The report on the milk feeding of children, published in both French and English, included data on breast milk and breast-feeding demonstrations; administration of cod-liver oil to or irradiation of the nursing mother; wet-nursing; the use of cow's milk, either fresh, dried, or as lactic-acid milk; and goat's milk.

The study of acute rheumatism in childhood called attention to the marked frequency of damaged hearts as sequelæ of acute rheumatic fever in childhood, and showed that heart disease in a given 5-year period caused, among white children from birth to 14 years, almost twice as many deaths as scarlet fever, four-fifths as many as measles, five-sevenths as many as whooping cough, and half as many as diphtheria. These figures indicate the importance of heart disease as a cause of child mortality in the United States. It is generally agreed that acute rheumatism is the most important single cause of heart disease in early life. It has been estimated that 75 per cent or more of children under 10 years of age are likely to have an involvement of the heart in the course of an attack of acute rheumatism. Hence the importance of the prevention and care of this condition as a public health problem is easily recognized.

The study considered the incidence of heart disease in various localities and the epidemiology of rheumatic fever, its etiology, modes of infection, prevention, and treatment.

COOPERATION WITH OTHER AGENCIES

During the fiscal year the cooperation of the child hygiene office with outside agencies has been principally as follows:

With the Bureau of Indian Affairs: The medical officer in charge served on a committee to prepare a minimum dietary standard for the children in the Indian schools in the United States.

With the Girl Scouts of the District of Columbia: As in the preceding eight years, physical examinations were conducted of the girls who registered for attendance at the Girl Scouts camp. At the close of the fiscal year 141 examinations had been made.

With the Department of Agriculture: The services of a special nurse were given to the 4-H Club for the period of their encampment in Washington in June, 1929.

MISCELLANEOUS

Health education material to the women of the country has been furnished upon request through direct correspondence from the child hygiene office. During the fiscal year almost 12,000 letters on questions of maternal, infant, and child hygiene were sent out from this office.

INDUSTRIAL HYGIENE AND SANITATION

The activities of the office of industrial hygiene and sanitation have been carried on under the direction of Surg. L. R. Thompson. They have included (1) studies of the possible health and industrial hazards connected with the distribution and use of tetraethyl lead gasoline; (2) studies of occupational health hazards; (3) industrial poisons; (4) studies of industrial morbidity and mortality; (5) cooperation with Government departments; (6) cooperation with industrial and other agencies.

INVESTIGATION OF TETRAETHYL LEAD

The tetraethyl lead investigation under the direction of Surg. J. P. Leake has continued to yield negative results, so far as evidence of poisoning from tetraethyl lead gasoline is concerned. It has never-

theless been recommended by the Surgeon General, after consultation with the members of the committee who advised him in 1925 and 1926, that the signs on the pumps dispensing motor fuel containing tetraethyl lead be made more uniform and plainer to the motorist as to the fact of lead content, and that reliance as to warning be placed on such signs rather than by requiring the word "ethyl" in the name of the gasoline, since the real possibility of hazard lies in the fact that the gasoline contains lead. This recommendation was adopted by the distributors.

Quantitative estimation of lead in urine and feces has been made in two laboratories in duplicate by the most improved technique and has yielded the result that variations of one or two tenths of a milligram are to be expected and that differences between the two laboratories as large as a half a milligram may occur. For this reason, if for no other, it seems likely that routine examination for stippling of the red blood cells is a better way of estimating lead risk than the chemical examination of urine and feces.

STUDIES OF OCCUPATIONAL HEALTH HAZARDS

Ventilation.—Investigations under this heading have been conducted along two general lines; (1) studies of natural and artificial ventilation as they relate to air conditioning; (2) study of the efficiency of ventilating devices in the removal of dusts, gases, and fumes.

In the investigation of school ventilation made by Sanitary Engineer Leonard Greenburg,¹¹ two groups of schools were studied: One ventilated by fans and one by windows, the respiratory disease rates among the children in the groups being compared.

From the findings of this study it was concluded that the atmospheric conditions produced by the systems of mechanical ventilation in use at the time of the study were associated with higher respiratory illness absence rates. These findings, however, should by no means be interpreted as condemning all mechanical systems of air conditioning.

Investigations of the practical efficiency of ventilating devices used in the removal of hazardous substances, such as dusts, fumes, gases, and sprays.—A study, referred to in the annual report for 1928, was made by Assistant Chemical Engineer J. J. Bloomfield dealing with the health hazards in chromium plating from the point of view of establishing fundamental data that could be used for the prevention and control of this occupational health hazard. Conditions in six chromium-plating establishments were studied in such a manner as to obtain information concerning the concentration of chromic-acid mist to which workers were exposed, and by means of physical examinations the effect of this quantity of chromic acid on the condition of the workers was ascertained. With such basic data as a guide, the type and degree of exhaust ventilation necessary showed that continuous daily exposure to concentrations of chromic acid greater than 1 milligram in 10 cubic meters of air is likely to cause definite injury to the nasal tissue of the workers. The results of this study were presented at the Institute of Chemistry at Northwestern University, August 9, 1928, and were published under the title, "Health Hazards in Chromium Plating."¹²

¹¹ Public Health Reports, Feb. 8, 1929. (Reprint No. 1264).

¹² Public Health Reports, Sept. 7, 1928. (Reprint No. 1245.)

The second of the series of ventilation studies has been completed and has been submitted for publication. This paper deals with the efficiency of the dust-removal systems in granite-cutting plants.

The third study, which has been in cooperation with the National Safety Council, relates to the health hazard in sand-blasting, and the fourth, which it is expected will be begun in the early fall, is in connection with the hydrogen-sulphide hazard in the manufacture of artificial silk.

Dust studies.—The investigations of the health of workers in the dusty trades has been carried on under the general supervision of Passed Asst. Surg. Albert E. Russell.

Granite dust.—The second bulletin dealing with the health of workers in the dusty trades was published at the end of the fiscal year.¹³ This report takes up the question of exposure of workers to siliceous dust in the granite-cutting industry. This dust was found to contain about 35 per cent free silica in the form of quartz.

The significant features of the picture presented as to what happens to men working for many years under a dust hazard of this sort are as follows: (a) The long period of service before the liability to tuberculosis becomes manifest (generally 20 years or more); (b) the sharp correlation between length of exposure to the dust and the prevalence of tuberculosis and also the death rate from this disease; (c) the close relation between extent of dust exposure and health of the men; (d) the universal occurrence of silicosis among the workers; (e) the large proportion of workers finally succumbing to tuberculosis; (f) the almost invariably fatal form of the disease, within a short time after the onset; (g) the different character of silicosis as manifested by X rays, compared with that shown where there is exposure to a dust with a much higher content of free silica; (h) the location of the tuberculous lesion, usually basal, where the disease complicates silicosis; (i) the absence of deaths from silicosis per se, tuberculosis apparently always intervening; (j) the failure of workers to recover from their condition upon going into nondusty trades; (k) the high incidence of sickness of a severe nature from causes other than tuberculosis; (l) the rising sickness and mortality rates from tuberculosis due to longer use of the hand pneumatic tool; (m) the appallingly high death rates at the present time from tuberculosis, compared with normal industrial experience.

It was recommended that granite-cutting plants employ local exhaust ventilation, adequately maintained, for the purpose of reducing to a safe limit the amount of dust which the workers breathe. It was concluded, on the basis of the widely different effect on workers in occupations exposed to varying amounts of dust, that this limit lies between ten and twenty million particles per cubic foot of air for the particular dust encountered in this investigation. It was also recommended that occupational processes in which little dust is produced be segregated in separate rooms of buildings.

Cotton dust.—The third bulletin of this series, relating to exposure to cotton dust, was completed during the year and will be published in the coming fiscal year.

Taken in connection with the other dust studies made by the Public Health Service and based on an analysis of the sickness

¹³ Health of Workers in Dusty Trades. II. Exposure to Siliceous Dust (Granite Industry). Public Health Bulletin No. 187.

records and physical examinations obtained in this particular study, the conclusion was reached that vegetable dust in the concentration found in this plant is not harmful to the industrial workers.

Coal dust.—The fourth bulletin of the series dealing with the health of workers in the dusty trades is being written. This study is concerned with exposure to carbon dust generated in the mining of anthracite coal in the Wilkes-Barre field. A smaller study is included of exposure to soft-coal dust in a West Virginia mine.

Pneumonia among steel workers.—The collection of records for a study of the pneumonia hazard in the steel industry is virtually completed, and the work of tabulating and analyzing the data is under way. It is apparent from a preliminary analysis that the hazard occurs only in those occupations involving exposure to extremely wide variations in temperature, especially when the work is strenuous, and in occupations in which certain other kinds of exposures are found. The records being analyzed cover all cases of respiratory illness causing disability for eight consecutive days or longer over a 5-year period among a group of about 12,000 steel workers.

Studies in physical development and posture.—The first bulletin dealing with the results of this investigation was published during the year and contained three papers: ¹⁴ (a) The effect on the physical condition and development of adolescent boys; (b) bodily growth with age; (c) physical fitness as reflected in tests of muscular strength.

Another bulletin is in course of preparation which will take up more specifically the postural relations found in the course of the investigation.

Temperature and humidity conditions in a cotton-cloth manufacturing plant.—Incidental to a study of the dust conditions in a cotton-cloth manufacturing plant located in the South, a thorough investigation was made as to the temperature and humidity conditions associated with various processes in the plant at different times of day and night and at different seasons of the year.

No final conclusion is possible as to the effect of such conditions upon the health of the workers in this plant. The analysis of the sickness rates failed to establish a definite association between the health of the workers and these conditions. On the other hand, the study does not lend any support to the conclusion that there is no association.

Studies of illumination.—These studies are being conducted under the supervision of Physicist James E. Ives, with the assistance of Junior Physicist F. L. Knowles.

Natural illumination in factories, hospitals, schools, etc.—Studies on the distribution of daylight in buildings have been continued in the experimental daylight building. Records have been obtained throughout the year by means of photoelectric cells of the illumination within the building and of the corresponding brightness of the sky, and a simple formula has been developed by means of which it will be possible to calculate the illumination within the building from a north sky for windows of various sizes, shapes, and locations. This formula takes into account not only the brightness of the sky, and the size, shape, and location of the windows, but also the loss of light due to reflection from the glass surfaces of the window. It is proposed to

¹⁴ Studies in Physical Development and Posture. Public Health Bulletin No. 179.

extend the formula so as to allow for the effect of the color of the walls and ceiling and for the height of the ceiling, and also for the effect of direct sunlight. If possible, it is proposed also to study the effectiveness of different types of glass in reducing glare due to direct sunlight and in distributing the light.

Studies in illumination in the Chicago Post Office.—Studies relative to the relationship of illumination to ocular efficiency and ocular fatigue which were carried on in the Chicago Post Office, were published.¹⁵

A relation has been shown between changes in illumination and the amount of first-class small mail sorted by the night clerks in the routine course of post-office work. No clearly marked relation was found to hold for the day clerks nor for other classes of mail.

The general eye examinations showed that the percentage of refractive errors among the clerks examined was rather large. Fifty per cent of them wore glasses. The percentages of other ocular defects found during the examinations seem to agree with those previously found by the United States Public Health Service and other investigators.

Loss of light due to smoke in New York City.—The results of this study have been analyzed and are now ready for publication.

The relation between skin temperature and exposure to radiant energy among iron and steel workers.—In the course of the investigation of the high incidence of pneumonia among iron and steel workers, a study was made to determine the relationship between skin temperature, the degree of radiant heat to which the workers were exposed, and the effective temperatures under which they worked. Instruments were devised suitable for measuring skin temperatures and radiant energy. It was found that exposure to high radiant energy produced a great increase of skin temperature.

Study of the health of workers and occupational environment in clock and watch factories where radium dial painting is carried on.—At the request of a large group of scientific, industrial, and labor bodies the Surgeon General called a conference at Washington, D. C., December 20, 1928, to discuss the possible health hazards connected with radium dial painting. As the result of this conference a committee was appointed, consisting of Prof. William Duane, Prof. Herman Schlundt, Prof. S. C. Lind, Dr. Alice Hamilton, Dr. Gioacchino Failla, Dr. O. H. Gish, Dr. L. F. Curtiss, Dr. C. F. Burnam, and Dr. H. S. Martland, to assist the Public Health Service in the various technical considerations connected with an investigation of this subject.

Surg. Louis Schwartz has been detailed in charge of the field investigations, which include a study of the physical condition of workers who have been engaged in radium dial painting, with special reference to their blood picture and the condition of their teeth. In addition an examination is being made of each worker to determine radioactivity.

Special attention is being given to the manner in which the workers are exposed to radium or its emanations and to the possible methods which may be installed for the protection of these workers against this hazard.

¹⁵ Studies in Illumination, II. Relationship of Illumination to Ocular Efficiency and Ocular Fatigue Among the Letter Separators in the Chicago Post Office. Public Health Bulletin No. 181.

INDUSTRIAL POISONS

Lead poisoning.—Under the direction of Passed Asst. Surg. Albert E. Russell studies are being conducted as to the nature and severity of the effects on workers exposed to a considerable lead hazard. Morbidity records have been carried for approximately 881 persons, and a total of 412 cases of lead absorption have been observed, of which there have been 87 cases of acute plumbism.

The work has also included a study of the blood to determine the best means of diagnosis of lead poisoning and the course of the blood changes prior to, during, and following acute poisoning.

Benzol poisoning as a possible hazard in chemical laboratories.—An investigation ¹⁶ was made by Assistant Chemical Engineer J. J. Bloomfield relative to the use of benzol in chemical laboratories. It was found that benzol is used to considerable extent in those laboratories where tests are conducted in connection with rubber, paint, varnish, and oil products. In such laboratories 3 to 5 gallons of benzol are used weekly. Air analyses made in three laboratory rooms where benzol was being used showed a concentration of vapor varying from 28 parts per million in one room to 223 parts per million in another. In view of the fact that previous studies had shown that concentrations even as low as 100 parts per million involved a substantial hazard, it was concluded that workers in laboratories where benzol is continually used might develop benzol poisoning after a continued period of exposure.

STUDIES OF INDUSTRIAL MORBIDITY AND MORTALITY

Studies of sickness among industrial workers have been carried on under the direction of Associate Statistician Rollo H. Britten and Associate Statistician Dean K. Brundage, and the results obtained during the first year may be summarized as follows:

A group of about 35 industrial sick-benefit associations and company relief departments has now afforded an 8-year record of the disabilities lasting longer than one week on account of sickness and injuries for which sick benefits were paid to members of these organizations. From 1921 to 1927 the average annual frequency of such cases among male employees was 101 per 1,000 persons. Respiratory diseases were reported as the cause of 41.8 per cent of the claims for illness benefits; digestive diseases, 13.7 per cent; and external causes (nonindustrial accidents), 10 per cent. These three groups accounted for virtually two-thirds of the cases. In the respiratory group, influenza and grippé were of outstanding importance, accounting for nearly one-half of all the respiratory cases recorded during the seven years ended December 31, 1927. The incidence rates by years, 1921-1927, showed an upward trend both for the respiratory and nonrespiratory groups of diseases.

The frequency of diseases lasting eight days or longer was 50 per cent higher among female than among male industrial employees, 1921-1927, although the comparison excluded nearly all diseases which were not common to both sexes.

Trend of disabling sickness among employees of a public utility.—The last of a series of three articles on the morbidity experience of

¹⁶ Public Health Reports, July 20, 1928. (Reprint No. 1237.)

employees of the Edison Electric Illuminating Co., of Boston, presented the rates of absence from work on account of disability year by year over the 11 years from 1917 to 1927.¹⁷ Disabling industrial accidents among the male employees showed a downward trend, not only for minor injuries but for the more severe industrial disablements as well, in contrast to a stationary trend in the frequency of injuries of nonindustrial origin. Diseases of the respiratory and of the digestive systems, which together caused 68 per cent of the disabilities, exhibited a stationary trend. Sickness as a whole showed no tendency to decrease in frequency. Not all diseases, however, within these three broad disease groups showed the same tendency. The experience of this group of 2,510 persons over an 11-year period can not be considered typical or representative of the trend of disabling sickness in the industrial population, but in the absence of morbidity data for the adult working population of the country, the record for even a very small sample of that population is of interest.

COOPERATION WITH GOVERNMENT DEPARTMENTS

As referred to in the last annual report, a committee of consultants consisting of Prof. C.-E. A. Winslow, Mr. Frank Irving Cooper, Mr. A. M. Feldman, Mr. D. D. Kimball, Mr. F. R. Still, Mr. R. E. Hall, and Prof. A. C. Willard, was called together by the Surgeon General at the request of the Architect of the Capitol, Mr. David Lynn, to aid in preparing requirements for the ventilation system of the chambers of the House of Representatives and the United States Senate. This committee furnished the architect with a statement of the requirements which should be met to provide adequate ventilation, examined the plans submitted by the various ventilating companies, and finally submitted to the architect, with its recommendations, the plan which it believed would give the most satisfactory air conditioning. Upon completion of the installation in the Chamber of the House of Representatives, a complete survey was made of the air conditions in the Chamber of the House under both summer and winter conditions.

At the request of the Post Office Department, Sanitary Engineer Leonard Greenburg conducted a ventilation study of the substation post office at the Graybar Building, New York City, and submitted detailed recommendations for improving the ventilation of this large workroom.

COOPERATION WITH INDUSTRIAL AND OTHER AGENCIES

Sanitary Engineer Leonard Greenburg assisted the State of New York in the compilation of a spray-painting code and in the compilation of a code covering the hazards of rock drilling. He also acted in cooperation with the New York Tuberculosis and Health Association in an investigation of the hazards of rock drilling in the New York City subway construction. Assistant Chemical Engineer J. J. Bloomfield cooperated with the National Safety Council in a study of the health hazards in sand-blasting. At the request of the health department of the State of Connecticut, Mr. Greenburg and Mr. Bloomfield assisted in the development of the division of industrial hygiene of that State.

¹⁷ Public Health Reports, July 27, 1928. (Reprint No. 1239.)

At the request of the committee on lighting legislation and natural lighting of the Illuminating Engineering Society, a report on the current practice of the lighting of school buildings in the United States was prepared by Physicist James E. Ives and published in the Public Health Reports.¹⁸

COOPERATION WITH THE BUREAU OF MINES

Cooperation with the Bureau of Mines of the Department of Commerce continued as in the past, Surg. R. R. Sayers, of the Public Health Service, remaining as chief of the health and safety branch and as chief surgeon of the health division. He was assisted by other officers detailed from the Public Health Service.

Health division.—The studies conducted during the year may be summarized as follows: Physiological effects of repeated daily exposure of several hours to small amounts of carbon monoxide;¹⁸ pathology and blood changes resulting from carbon monoxide poisoning, with a view to devising a further method of treatment; comparison of amounts of carbon monoxide in exhaust gases of automobiles using ethyl gasoline and those using ordinary gasoline; effects on animals of repeated daily exposure to low concentrations of methyl chloride in connection with its use as a refrigerant (supplementary study of acute poisoning published as Public Health Bulletin No. 185); possible warning agents for illuminating gas; testing of gas masks and hose masks for the purpose of establishing a list of equipment for respiratory protection; analyses of gas samples in connection with ventilation studies, safety inspections, extinction of mine fires, investigation of coal-mine explosions, etc. (approximately 2,400 samples were analyzed during the year); character of the drainage from coal mines and coal seams, factors affecting the formation of acid drainage, effect on streams and methods of disposal; physiological and pathological action of gases and vapors; effect of intraperitoneal injection in guinea pigs of suspensions of samples of dust to determine their suitability for rock-dusting coal mines; physical examination of miners (9,208 examinations made).

Safety division.—The activities of this division continued along the same lines as in the past.

MILK INVESTIGATIONS

The activities of the office of milk investigations were carried on under the direction of Sanitary Engineer Leslie C. Frank. Headquarters for this work were moved to Washington, D. C., during January, 1929.

The activities included the following:

(1) A study of the prevalence of milk-borne outbreaks of communicable diseases for the fiscal year 1928.

(2) Advice and assistance to State and city health departments with reference to their milk sanitation control problems.

(3) Conferences with various committees for the purpose of determining any modifications which the committees would suggest for the improvement of the Standard Milk Ordinance and the Standard Milk Control Code.

¹⁸ Public Health Reports, Dec. 14, 1928. (Reprint No. 1261.)

(4) A study of the 1927 status of American cities of 10,000 population and over with reference to tuberculin testing and pasteurization.

(5) Surveys to determine the milk sanitation ratings of cities.

(6) The testing of pasteurization machinery.

(1) *A study of the prevalence of milk-borne outbreaks of communicable disease for the year 1928.*—As in previous years, a questionnaire was addressed to all State health officers and to the city health officers of all cities of 10,000 population and over requesting reports as to the occurrence of any milk-borne outbreaks of communicable disease during the year 1928. A tabulation of the outbreaks reported is given below:

Milk-borne outbreaks of communicable disease reported for 1928

	Number of—				Number of—		
	Out-breaks	Cases	Deaths		Out-breaks	Cases	Deaths
Typhoid.....	26	448	48	Dysentery.....	1	126	17
Scarlet fever.....	8	369	6	Gastroenteritis.....	2	104	0
Undulant fever.....	5	21	0				
Diphtheria.....	2	48	0	Total.....	47	2,196	120
Septic sore throat.....	3	1,080	49				

(2) *Advice and assistance to State and city health departments with reference to their milk sanitation control problems.*—During the fiscal year the office of milk investigations continued its function of responding to the calls of State and city health officers for advice and assistance in matters of milk sanitation control.

The advisory assistance which the Public Health Service milk specialists have rendered to State health departments has consisted of field studies to determine the proper organization of the State health department milk sanitation program. In a number of States the service officer has assisted the State health department in beginning the execution of the recommended program.

The advisory assistance which the Public Health Service milk specialists have rendered to the city health departments has consisted of field studies of the local milk sanitation control problems, recommendations as to the type of milk sanitation ordinance which would be effective in solving the problems, and temporary assistance in establishing the proper enforcement of the recommended type of ordinance.

(3) *Conferences with various public health and industry committees.*—In the annual report of the Public Health Service for 1928 (p. 53) it was noted that the Standard Milk Ordinance and Code had been submitted to various national dairy and public health organizations with the request that committees be appointed to study it and confer with the Public Health Service regarding any desirable modifications.

Accordingly, during the fiscal year 1929, conferences were held with the committee on dairy products of the American Public Health Association, the committee on milk supply of the engineering section of the American Public Health Association, the committee on milk of the Conference of State and Provincial Health Authorities, the committee on milk sanitation of the Conference of State Sanitary

Engineers, and the committee on ordinances of the American Dairy Science Association.

These conferences yielded a number of valuable suggestions which are being incorporated in a forthcoming edition of the ordinance and code.

(4) *A study of the 1927 status of American cities of 10,000 population and over, with reference to tuberculin testing and pasteurization.*—During the fiscal year further work was done in analyzing and interpreting the data collected during the preceding fiscal year from cities of 10,000 population and over, as to their status with reference to tuberculin testing and pasteurization. The summary of a paper which has been prepared upon this subject is as follows:

Size of city	Number of cities reporting	Combined population	Per cent of milk from tested cows	Per cent of milk pasteurized	Per cent of milk which is either pasteurized or from tuberculin-tested cows
10,000-25,000-----	128	2,039,173	84.7	43.7	94.7
25,000-50,000-----	70	2,443,548	82.3	64.0	98.4
50,000-100,000-----	66	4,564,927	70.1	71.7	98.7
100,000-250,000-----	38	5,399,363	66.3	77.5	99.0
250,000-500,000-----	13	4,489,118	51.4	86.3	100.0
500,000 and over-----	8	10,483,296	68.7	98.2	100.0
All groups-----	323	29,419,385	69.0	81.8	99.1

(5) *Surveys to determine the milk sanitation progress in cities enforcing the Standard Milk Ordinance.*—During the fiscal year the sanitary engineers and milk specialists of the Public Health Service made intensive surveys to determine the milk sanitation status of cities enforcing the Standard Milk Ordinance. The surveys were made in order to determine the improvement in milk quality and the increase in market milk sales effected by the enforcement of the ordinance. Intensive work was done in South Carolina, Tennessee, Mississippi, Louisiana, Arizona, Texas, Missouri, North Carolina, Alabama, and West Virginia.

(6) *The testing of pasteurization machinery.*—During the fiscal year the work of testing pasteurization machinery was continued. A report is being prepared containing the results secured in the testing of 41 vat types, 13 pocket types, 1 continuous-flow type, 1 in-bottle type, 1 electric-flash type, and 1 steam-flash type of pasteurization machinery.

SURVEY OF SALT-MARSH AREAS

The preliminary survey of the salt-marsh areas of the South Atlantic and Gulf States, which was inaugurated in August, 1926, extended through the fiscal year ended June 30, 1929, at which time, owing to lack of specific appropriation, the preliminary survey was concluded.

General survey.—Character of breeding places, as to soils, vegetation, salinity, tides, temperatures, and other conditions, for the various species of salt-marsh mosquitoes, seasonal broods, oviposition, dispersal and migratory flights, and methods of control were investigated in Alabama, Florida, Mississippi, North Carolina, South Carolina,

and Virginia. This was not a year of devastating flights of the salt-marsh mosquitoes in the territory covered by the survey. For instance, there was no definite migratory flight of salt-water *Aedes* on the Mississippi coast after July 25; and while there were local infestations at many points along the South Atlantic and Gulf coasts, there was none of long duration or of severe intensity as have occurred in years past after long-continued droughts. Following storms at two different periods on the east coast of Florida, observations were made as to "wind-blown" mosquitoes. In each instance there was no immediate prevalence of mosquitoes. However, seven days after the storms there was a disturbing prevalence of salt-water *Aedes* (principally *taeniorhynchus*), thus allowing five or six days for ovipositing, larval and pupal development, and one day for development of desire for food in the imago, before mosquitoes became troublesome. The usual opinion has been that storms carry the salt-marsh mosquito. However, these observations show that salt-marsh mosquitoes developed in the more or less saline waters remaining as a consequence of these storms. During the season it was repeatedly observed that from the egg to the imago (*sollicitans*) a period of only five days elapsed. This is a shorter aquatic stage for this species than has heretofore been noted.

Special surveys.—Surveys in considerable detail were made in the "Greater Miami" (Florida) district, including Biscayne and Virginia Keys and the mainland marshes. This district proposes the inauguration of salt-marsh mosquito control as a necessary part of their general development program. Surveys were also conducted in all the coastal counties of North Carolina, but not in such detail as planned, owing to repeated heavy rainfall and the difficulties of land and water transportation. Notwithstanding these difficulties, sufficient data and material were obtained to reach definite conclusions as to breeding conditions and plans of control. Two counties in Florida (St. Lucie and Indian River) have continued control operations begun in 1927. Successful drainage against *Aedes* is being accomplished under difficult conditions, so that now Fort Pierce, in St. Lucie County, which had been for years widely advertised as a mosquito-ridden place, is progressively being rendered free from salt-marsh mosquito invasions. Antimosquito drainage has been accomplished in more than half of the marsh areas since the inauguration of the work. Similar work in Indian River County is likewise progressing.

On the North Carolina coast surveys were made of salt marshes in Brunswick, Pender, Onslow, Carteret, Craven, Beaufort, Pasquotank, Perquimans, Washington, Chowan, Tyrrell, Hyde, Dare, Currituck, and Pamlico Counties. All of these counties have important salt-marsh breeding areas, and a large acreage can be made productive where now whole sections are rendered practically worthless through the tormenting mosquito prevalence. The actual or potential breeding areas are increased materially, particularly in the Albemarle and Pamlico Sounds sections, in years of low rainfall when these bodies of water and their affluent streams become saline. Dare, Hyde, and Tyrrell Counties present the most extensive areas of breeding grounds. Generally considered, the areas responsible for the greater part of the production of *Aedes sollicitans*, the chief tormentor of the North Carolina coast, are the water-holding muck and clayey depressions

along the mainland side of the "banks," separating the Atlantic from the sounds along the coast, while mainland marshes, especially those of Hyde, Tyrrell, and Dare Counties, constitute breeding grounds of vast and important proportions. New Hanover County, which was surveyed in considerable detail in 1927, is equipped, financially and with respect to trained health personnel, to proceed in the investment of salt-marsh mosquito control. In other sections, as at Morehead City and Beaufort, where mosquito disturbance is seriously threatening further development, or even hazarding investments already made, control may be secured within economic bounds by gravity drainage. Much of these lands, now barren wastes on account of mosquitoes, would be reclaimed for pasture land or made productive, tillable soil by mosquito drainage, as have similar lands in New Jersey, which have increased in taxable valuations as much as 500 per cent following mosquito control by drainage.

Harrison County, Miss., having appropriated \$20,000 for inaugurating salt-marsh mosquito control in 1929, a survey in detail, with preparation of maps and estimates, was made of the outlying islands and mainland marshes, and the report will be submitted to the State health department. A similar survey was made in Jackson County, adjoining Harrison County.

Legislation.—A law was enacted by the Florida Legislature in the session of 1929 enabling counties to tax themselves for mosquito control. This act was based on the Mississippi law but differing in some respects so as to be adjusted to Florida legal and financial conditions.

Antimosquito congress.—For the collection and distribution of information on mosquitoes and their control and to encourage and support all serious efforts aimed at solving the salt-marsh mosquito problems in the southern States there was formed at meetings held successively at Biloxi, Mobile, and New Orleans in the spring of 1929 the Gulf and South Atlantic Antimosquito Congress. The officers and members of this congress are representative citizens, business and professional men, members of chambers of commerce, industrial, city, county, and State organizations, and others who recognize the tremendous importance of the work undertaken. This is not primarily a health organization but is designed as a strong factor to support organized public health.

STATISTICAL INVESTIGATIONS

The office of statistical investigations was under the general direction of Statistician Edgar Sydenstricker up to September 15, 1928, at which time he was, at his request, put on a part-time basis. Since September 15, 1928, the office has been under the general direction of Associate Statistician Selwyn D. Collins, with Mr. Sydenstricker acting as a consultant in all of the important phases of the work. The investigations include work carried on in the statistical office independently as well as in collaboration with other stations of the division of scientific research and with other divisions of the service.

STUDIES OF INFLUENZA AND OTHER RESPIRATORY DISEASES

The considerable influenza epidemic of the winter of 1928-29 began on the Pacific coast as early as October. From the time that the epi-

demic reached proportions of considerable size the attention of this office has been fixed upon influenza.

The conduct of the studies of influenza and minor respiratory diseases was put under the direction of a board consisting of Surg. W. H. Frost, Statistician Edgar Sydenstricker, and Associate Statistician Selwyn D. Collins. This board has served in an advisory capacity, but the influenza work has, for the most part, been made an integral part of the work of the office of statistical investigations, and the temporary employees hired for this special work have worked with and under the direction of the more experienced personnel of the office.

The influenza studies have been prosecuted along five lines of investigation:

(a) In the early stages of the 1928-29 influenza epidemic the Public Health Service decided to make a canvass of representative districts in a group of cities of the United States to determine the extent of illness from influenza. Inasmuch as the service had in 1918-19 made a similar canvass, every effort was made to secure the data for this epidemic in a comparable way so that the prevalence of influenza could be compared for the two epidemics. Several of the cities selected were the same as those canvassed in 1918, but it was not practicable to survey all of the same cities. Canvasses were made of representative districts in each of the following cities: San Francisco, Seattle, Des Moines, Kansas City (Mo.), New Orleans, Cincinnati, Pittsburgh, Baltimore, Syracuse, and Boston. In those cities having a population of more than 400,000 sufficient households were canvassed to secure data on 15,000 individuals, and in cities of less than 400,000 data for 10,000 individuals were secured. The collection of the data in each city was conducted under the direction of an official of the United States Public Health Service who was already stationed in that city (at marine hospitals or other service stations), and all the field operations were under the general direction of Passed Asst. Surg. M. V. Veldee, with whom the office of statistical investigations cooperated in getting out instructions to officials in charge of the surveys, instructions to enumerators, forms for recording the data, and other details. In addition to the records of the canvasses there was secured from the city health department a record of deaths from respiratory diseases throughout the year 1928 and through as many months of 1929 as were available at the time the records were transcribed.

A preliminary report by Passed Asst. Surg. M. V. Veldee was published in the Public Health Reports,¹⁹ but the results of the canvasses were turned over to the office of statistical investigations for final tabulation and analysis by date of onset, age, sex, etc., and considerable time of the personnel of this office during the past six months has been spent in coding, punching, and tabulating the data. The coding and punching of the entire mass of data were virtually complete at the end of the fiscal year and sorting and tabulation were immediately begun.

(b) A study of influenza occurring since January 1, 1920, in a group of 95 cities, distributed in all the geographical sections of the United States. Weekly deaths from influenza and pneumonia were

¹⁹ Public Health Reports, May 10, 1929. (Reprint 1283.)

available for these cities from the records of the Division of Sanitary Reports and Statistics of the Public Health Service from the beginning of 1920 to the present time. The median rate for each week of the year was computed for the period 1921-1927 and the excess over this median was taken as indicating the influenza epidemics. The influenza epidemic of 1928-29 was the sixth epidemic since January 1, 1920, which reached more or less national proportions. The recent epidemic was the most severe since that of 1920 and caused about one-fifth of the total excess influenza and pneumonia deaths that have occurred since the beginning of 1920. The total influenza and pneumonia deaths in excess of the normal seasonal expectancy since January 1, 1920, has amounted to 40 to 50 per cent of the total of 500,000 deaths that occurred in the United States during the great pandemic of 1918-19. A special report on these epidemics including total excess death rates in each geographical area for each epidemic, the chronology of each epidemic—that is, the section in which the epidemic started and the direction of its spread to other sections of the country—and other epidemiological characteristics of influenza epidemics since 1920 is about complete and will be submitted for publication early in the new fiscal year.

(c) A study of monthly excess influenza and pneumonia death rates in each of 50 large cities of the United States from 1910 to the present time. This study includes the consideration of the variation in the total excess rates for the different cities in a given epidemic, the correlation of the excess death rate in one epidemic with that of other epidemics, the correlation of the excess influenza and pneumonia death rates with the death rates from other causes during the periods prior to the epidemics when the city was more or less free from influenza, and the course of influenza in each of these cities during this 18-year period.

(d) The occurrence of influenza epidemics in cities throughout the world during the past 30 or 40 years. This phase of influenza work has been under the direction of Surg. W. H. Frost and has been carried on in Baltimore, Md. It is mentioned here to complete the picture of the influenza studies that have been conducted by the Public Health Service.

(e) The analysis of data collected by Surg. J. G. Townsend on the common cold and other minor respiratory diseases in a group of families of medical officers of the United States Army, Navy, and Public Health Service was continued under the immediate supervision of Associate Statistician Mary Gover. These data are being analyzed to show not only the sex, age, and chronological incidence, but the symptomatology of the various respiratory diseases and to compare the symptomatology of cases occurring in the summer or in other periods of low incidence of respiratory diseases with the symptomatology of cases occurring in the winter periods of high incidence.

STUDIES ON MORBIDITY STATISTICS

The collection of statistics of morbidity was continued. These statistics are based on records not only of those diseases which ordinarily are reportable to health departments but also of sickness and impairments resulting from other causes in special population groups. In cooperation with the office of industrial hygiene and

sanitation, reports were received covering about 150,000 industrial workers, this being the ninth year of the collection of these morbidity records.

Three additional papers were prepared on the Hagerstown Morbidity Studies, one of which, on the completeness of reporting of communicable diseases of children, was published²⁰ and the other two, on illness among persons of different economic status, and the fertility of women in families of different economic status, are in proof. Considerable work has also been done on another paper on measles and whooping cough, including secondary-attack rates among children of different ages who had not had a prior attack, the percentage of children under 15 years of age who had been attacked before the epidemic compared with the same percentage after the epidemic had subsided, and other similar items. After the publication of these and perhaps one or two other Hagerstown studies, it is expected to bring together the various studies in more convenient form for distribution.

CURRENT MORTALITY STATISTICS

The collection and publication of monthly mortality statistics from such States as could furnish data to the Public Health Service was continued throughout the year, in cooperation with the division of sanitary reports and statistics. As explained in last years' report, the States were canvassed to find what States could furnish these monthly data and the causes of death that could be secured monthly. The 13 States which were included in the first monthly summaries published by the Public Health Service have now been increased to 22 States, and the 15 causes of death have been increased to 22 causes, 18 of which are specific diseases and the other 4 are broader groups of diseases. In addition, death rates from all causes, infant-mortality rates from all causes and infant mortality rates from malformations and early infancy are published.

In compiling and publishing these data on current mortality, the Public Health Service is attempting to act in the capacity of a clearing house to make available to the various States such current data as are tabulated by the various State health departments, but are not published and circulated to other States. The promptness with which data can be secured varies for the different States. Usually the monthly summary is sent to press about the 15th of the month, and for the group of States most prompt in reporting this includes data for the month ending 45 days preceding.

The data collected for the monthly mortality compilations, as corrected and supplemented by such annual summaries as can be secured from the States, have been used as the basis for a preliminary summary of mortality in the various States during the calendar year 1928. This summary²¹ included death rates from 16 causes, in addition to death rates from all causes, infant mortality from all causes, and infant mortality from malformations and early infancy for a maximum of 12 States with about 40,000,000 population; but for some of the causes of death data were available from only a few States. In addition to rates for 1928, rates for the same States were

²⁰ Public Health Reports, June 28, 1929. (Reprint 1294.)

²¹ Public Health Reports, May 3, 1929.

given for each of the years back to 1923. This gave an accurate idea of the trend of a given disease in recent years, even though the various causes of death were not strictly comparable because they were based on varying numbers of States. In addition to this summary table, rates were given for the various causes by States. Although these data are quite preliminary and subject to change by reason of various corrections, it is believed that they will serve a fairly useful purpose until final figures are compiled and published by the Bureau of the Census.

CURRENT PREVALENCE OF DISEASE

Monthly summaries have been published on the prevalence of disease throughout the world. For the United States the summaries are based on the weekly telegraphic reports of cases of communicable diseases received from State health departments by the division of sanitary reports and statistics. For foreign countries, the summaries are abstracts of data published in the Monthly Epidemiological Report issued by the health section of the League of Nations.

NEGRO MORTALITY

Continuing the study of negro mortality which was begun in Public Health Bulletin 174, Acting Asst. Surg. Amanda L. Stoughton and Associate Statistician Mary Gover prepared a paper on the trend of negro infant mortality in certain cities and States of the United States. It was found that although the negro infant mortality rates are higher than those for white infants, the rates for negroes have steadily decreased during recent years in nearly all places. It is expected that this study will soon appear in the Public Health Reports.

COOPERATION WITH OTHER OFFICES AND DIVISIONS OF THE SERVICE

A considerable part of the work of the office of statistical investigations consists of the rendering of assistance to other offices and divisions of the service. This cooperation comprises the following:

- (1) Technical advice and criticism on statistical procedure;
- (2) Assignment of statistical personnel to assist other statistical units;
- (3) Use of mechanical equipment and of operators.

Child hygiene.—During the year, much of the time of the associate statistician in charge has been devoted to the completion of child hygiene projects which were under way before his transfer from the office of child hygiene to the office of statistical investigations. Clerical help in this work has been furnished by the office of child hygiene, since the statistical and clerical forces of the two offices have served, as in past years, as a unit. During the year the following papers have been prepared or published under this cooperative scheme:

Age Incidence of Common Communicable Diseases of Children. (Public Health Reports, April 5, 1929; Reprint 1275.)

Physical Measurements of Boys and Girls of Native White Race Stock in the United States. (Public Health Reports, May 3, 1929; Reprint 1281.)

Refractive Errors in the Eyes of Children as Determined by Retinoscopic Examination with a Cycloplegic. (Public Health Bulletin No. 182.)

In addition, there is in proof a paper on the relationship between the mental and physical status of school children in Illinois.

Much time has been spent on (a) the preparation of a bulletin on the health of school children as indicated by sickness causing absence from school, physical defects as found on physical examination, and mortality. In this bulletin rates for sickness, physical defects, and mortality from specific causes for children of different ages and sexes will be included. (b) The tabulation of detailed data on the condition of the teeth of school children. A series of papers is planned which will consider the extent of decayed teeth in children of different ages and sexes, the extent of decay of each specific tooth among children of different ages and the relative susceptibility to decay on the part of each specific tooth.

STREAM POLLUTION

Stream-pollution studies have been conducted as formerly under the direction of Surg. W. H. Frost, stationed in Baltimore, Md., the administrative headquarters and research laboratories at Cincinnati, Ohio, being operated under the immediate charge of Sanitary Engineer J. K. Hoskins. A board of special consultants, the membership of which has remained unchanged from the preceding year, has given advice regarding policy and general plan of research and choice of technical methods.

The principal activities, for the most part continuing investigations organized in previous years, have been as follows:

(1) A critical study of the pollution of the Mississippi River in the vicinity of Minneapolis and St. Paul, by Sanitary Engineer H. R. Crohurst.

(2) Experimental studies of certain fundamental phenomena of natural purification in polluted waters, conducted jointly by Bacteriologist C. T. Butterfield, Chemist E. J. Theriault, and Special Expert (Biology) W. C. Purdy, together with a small staff of technical assistants.

(3) Experimental studies of rapid sand water filtration and statistical investigation of operating efficiencies of full-sized water purification plants, conducted by Sanitary Engineer H. W. Streeter.

(4) An epidemiological study of typhoid fever in certain Ohio River cities, with special reference to its possible relation to bacteriological quality of the public water supplies, conducted by Passed Asst. Surg. M. V. Veldee.

(5) Miscellaneous activities, including assistance and advice to State officials in technical features of stream examination and stream-pollution control, and the presentation of a systematic brief course of instruction in methods applicable to the study of stream pollution, open to representatives of State health departments.

Mississippi River investigation.—The purpose and scope of this study and the circumstances leading to its inauguration in 1925 have been described in earlier reports. The facts collected during the field survey, which was completed in the autumn of 1927, having been made available promptly thereafter in a preliminary report to the various cooperating agencies in such form as to be most useful in planning local remedial measures, the available data have since been rearranged and more elaborately analyzed with a view to bringing

out various relationships of general interest in connection with fundamental problems of natural stream purification.

The data so analyzed have been assembled in a report similar in form to previous publications reporting stream purification studies, and so far as possible the processes of purification occurring in the upper Mississippi have been compared quantitatively with those observed in the other rivers which have been studied intensively.

Experimental studies of the phenomena of natural purification of polluted waters.—The increase in population of our cities, contributing a constantly growing burden of sewage pollution to the waters into which these cities discharge their sewage and industrial wastes, makes more urgent each year the necessity of appraising broadly the status of pollution in the waters of each drainage area and of formulating plans for conservation. In detail the necessary measures will doubtless differ in different areas, but the guiding principles must be everywhere the same, namely, to utilize most effectively the processes of natural purification in sewage-polluted waters, and to apply economically the most effective known methods of artificial sewage treatment. Since the sewage treatment processes which have proved most efficient are merely devices of one kind or another for facilitating and accelerating the same processes of purification which take place naturally in polluted waters, the basic problem of stream pollution is to acquire correct and exact knowledge of these natural processes. The Public Health Service has therefore for a number of years followed the consistent policy of devoting the major part of its effort in studies of stream pollution to investigating the complex biological processes which enter into natural purification. In pursuance of this policy, as stated in the annual report for the fiscal year 1928, attention was devoted for several years chiefly to determining, in a systematic way, the rates of purification actually taking place in larger streams, as exemplified by the Potomac, the Ohio, and the Illinois Rivers. Having established rather crudely by these studies certain general laws governing average rates of purification, the next steps have been (a) to check and correct these general laws by further observations on other streams, as in the recent study of the Mississippi River, and (b) to seek a better analysis of the factors concerned by studying the rates of purification observed under simplified and controlled experimental conditions.

Since natural purification is in large measure the result of biological reactions, particular attention has been directed to studying the functions of bacteria and plankton, the groups of organisms believed to be most directly concerned; to developing methods for measuring the significant biological and chemical changes which take place; and to investigating the relationship of varying physical conditions to rates of purification.

For experimental studies of these processes an artificial channel was constructed at the Cincinnati laboratory in 1926, and has been in operation at intervals every since. The channel, which is approximately 1 mile in length, carries a continuous flow at a controlled rate of water delivered from the Ohio River, with added sewage pollution effected by the controlled addition of varying amounts of crude sewage. At the end of the last fiscal year the observations made during the summer of 1927 and the spring of 1928 had already demonstrated that this artificial stream satisfactorily reproduced the

processes of natural purification previously observed in natural streams. The study was still deficient, however, in that it had been impracticable to keep the channel in operation throughout the winter season because of interruption due to freezing, and also because insufficient observations had been made on certain chemical changes, especially rates of oxidation. During the past year a glass housing has been erected over the channel, making it possible to continue uninterrupted operation through the winter at temperatures just above freezing, and the schedule of observations made has included systematic measurements of oxidation.

The results already obtained are illuminating in their bearing on factors influencing the rates of purification, both in natural streams and in artificial sewage-treatment plants; and, probably of more importance, the plant has established its adaptability to further experimental investigations.

Parallel with the observations on this channel other experiments have been going forward, especially a study of factors influencing biological oxidation; and during the latter half of the year progress has been made in preparing for publication a series of reports on various phases of these studies.

Studies of the efficiency of artificial water purification processes.—Collective and experimental studies of the efficiency of artificial water purification processes, begun during the summer of 1924, have been continued under the direction of Sanitary Engineer H. W. Streeter, with the aid of a technical assistant and with the advice and cooperation of Special Consultant J. W. Ellms, of Cleveland.

The general purpose of these studies has been to determine more exactly, under conditions both of actual practice and of experimental control, the efficiencies and limitations of methods commonly used in this country for the purification of water supplies taken from polluted sources. Begun as an appraisal of purification processes already in general use, the investigation has recently been extended to embrace experimental studies of various proposed devices for increasing the bacterial efficiency of current water purification processes, without entailing extensive changes in the design or construction of existing plants.

Prior to the close of the fiscal year 1928, collective surveys of the operation and efficiency of some 30 representative municipal water purification systems had been made, including (1) the survey of a group of plants taking their raw waters from the Ohio River and other rivers of the Middle Western and Eastern States;²² and (2) a similar field survey of another group using the Great Lakes as their source of raw water.²³ In addition, a series of experimental studies of the purification of Ohio River water had been carried on at Cincinnati, with the purpose of checking, under controlled conditions, some of the more important findings of the field surveys in respect to the purification of river waters. A later series of experiments²⁴ has dealt principally with the efficacy of various proposed measures for increasing the bacterial efficiency of existing water purification processes. The modifications of treatment so far investigated include: (a) Prolongation of the period of sedimentation; (b) adjustment of the

²² Public Health Bulletin No. 172.

²³ A report in press.

²⁴ Public Health Reports, Oct. 1, 1926 (Reprint No. 1114) (2 papers), and Public Health Reports, July 15, 1927 (Reprint No. 1170).

hydrogen-ion concentration of the coagulation reaction; (c) the effect of increasing amounts of coagulants; (d) raw water prechlorination; and (e) addition of an excess of lime to the raw water. Simultaneous observations of the comparative efficiency of different methods of treatment have been made possible in these experiments through the arrangement of the experimental plant in two parallel series of duplicate units, each capable of being operated independently of the other under precisely similar conditions.

Relationship of water supplies to typhoid fever in Ohio River cities.—In November, 1927, Passed Asst. Surg. M. V. Veldee was assigned to carry on a previously undertaken but interrupted epidemiological study of typhoid fever in certain Ohio River cities, with special reference to investigating the relationship of the prevalence of this disease to bacteriological quality of the municipal water supplies. The cities selected for study were Steubenville, East Liverpool, Ironton, and Portsmouth, Ohio, Wheeling, W. Va., and Ashland, Ky.

The special reasons for undertaking this study were as follows: (1) The cities in question were all drawing their water supplies from the Ohio River, depending upon the continued efficiency of their artificial purification processes as their safeguard against infection from a dangerously polluted raw water; (2) complete records of unusually careful bacteriological examinations of these water supplies were available currently and for the entire period of years since 1923; (3) the endemic prevalence of typhoid fever in these cities had fallen to such a low level that it seemed possible by careful epidemiological study to discover and identify even slight outbreaks actually due to contamination of the public water supply; (4) full cooperation was assured on the part of State and local health authorities and practicing physicians.

In addition to collecting all available morbidity and mortality records for the past decade, Passed Asst. Surg. Veldee during the entire year 1928, made frequent visits to each of the cities, ascertaining the number of cases of typhoid fever which has been reported since his previous visit and personally investigating each case. He also made a detailed sanitary survey of each city.

The results of the study remain as stated in the annual report for 1928; that is, the study has yielded no evidence of existing infection attributable to contamination of the public water supplies of any of these cities during the period of study. This result is entirely consistent with the current bacteriological records, which indicate sustained good quality of the treated water supplies and tends to confirm the opinion that artificially purified water supplies conforming to the high bacteriological standards now rated as acceptable represent no appreciable risk as regards conveyance of typhoid fever.

Since it seemed unlikely that further continuance of the study would lead to a different result, field work was discontinued during the early months of 1929; and after assembling the facts which had been collected Doctor Veldee was transferred to other duty at the Hygienic Laboratory.

Course of instruction for State officials.—Early in the year the Conference of State Sanitary Engineers requested the Surgeon General to authorize the presentation at Cincinnati of a brief course of instruction in technical aspects of the study and control of stream pollution, for the benefit of technical employees of sanitary engineering divisions

of State health departments. In compliance with this request, the personnel of the Cincinnati laboratory were instructed to make preparation for a 2-week course, which was presented in the latter half of March, 1929. The instruction consisted of (1) demonstrations of laboratory, field, and statistical methods employed in the study of stream pollution, and (2) lectures and informal discussions on various topics relating to the duties and technical interests of State sanitary engineers. The staff of the Cincinnati laboratory was assisted by a number of other officers of the Public Health Service and by several State officials in presenting these courses. A group of 21 students, representing as many States, was in attendance, this being the maximum number that could be accommodated.

Although the work incident to preparing and presenting this course involved rather serious interruption of the usual research work of the station, it is believed that this was fully justified by the full attendance and it is expected that similar courses will be offered hereafter from time to time.

Miscellaneous assignments.—In the course of the year Special Expert W. C. Purdy was detailed, at the request of the Illinois State health authorities, to confer with them concerning biological aspects of stream-pollution studies in progress or contemplated in that State; and was again detailed, at the request of the Minnesota State Department of Health for review of biological data collected by them. Sanitary Engineer H. W. Streeter was detailed to Minnesota on a similar request for conference with reference to certain operating features of the water-purification plants in Minneapolis and St. Paul.

HYGIENIC LABORATORY

Personnel.—The administration of the Hygienic Laboratory during the fiscal year 1929 continued under Surg. George W. McCoy as director, and Surg. R. E. Dyer as assistant director.

During the year the laboratory staff sustained a great loss in the death of Surg. Joseph Goldberger on January 17, 1929, from a malignant growth. His achievements in the field of medical research were notable. He made valuable contributions to the literature on measles, typhus fever, diphtheria, dengue, cholera, and nutritional diseases. During the earlier years of his service he contracted diseases which he was engaged in studying on three separate occasions—dengue, typhus, and yellow fever. The last 15 years of his life resulted in the discovery of the cause, cure, and methods for the prevention of pellagra. These researches also developed valuable methods for the investigation of other nutritional diseases. This work represents Doctor Goldberger's greatest contribution to medicine and is regarded by his colleagues as an achievement equal to any made during the present generation.

Doctor Goldberger's absence from the laboratory is keenly felt. His friendly and searching criticisms of the results of investigations which were brought to him for analysis and suggestion were of great value. His logical mind, sense of humor, happy gift of phraseology, and ironical scorn of all sham, subterfuge, and pretense made him a charming companion as well as a highly valued colleague.

Publications.—Several papers by workers in the laboratory appeared in the Public Health Reports and as Supplements. A con-

siderable number of articles pertaining to the work of the institution were published in private scientific journals. One Hygienic Laboratory Bulletin was issued during this year and a second bulletin is in press.

Library.—During the fiscal year 1928–29, 508 bound volumes were acquired by purchase and gift, bringing the total number of accessions to 13,735. There were 272 periodicals received, and in addition to the annual reports 80 bulletins of State and municipal health departments were added to the collection.

DIVISION OF PATHOLOGY AND BACTERIOLOGY

The activities of this division are reported below under the chief subjects in which investigations were made:

STUDIES OF NUTRITIONAL DISEASES

The laboratory investigations of nutritional diseases were carried out under the direction of Surg. Joseph Goldberger until his death, and afterward by his associate, Asst. Surg. W. H. Sebrell, who has had the benefit of the helpful supervision of Surg. G. A. Wheeler, who has had charge of nutritional disease field investigations since the death of Doctor Goldberger. The studies consisted of (1) tests of individual foodstuffs in the dog and albino rat to determine their probable pellagra-preventive value; (2) a test of the antineuritic and P-P potency of various food substances and concentrates in the albino rat; (3) an attempt to produce pellagra in the monkey.

A more comprehensive report of the studies of nutritional diseases is to be found on page 38.

STUDIES OF INFECTIOUS DISEASES

Tularaemia.—Studies of tularaemia under Surg. Edward Francis, although interrupted by a prolonged illness of this officer due to undulant fever, were continued and may be summarized as follows: (1) Two States in which human cases of tularaemia had not hitherto been recognized were added during the year to the area of known geographic distribution, which now comprises 41 States, the District of Columbia, Japan, and Russia. (2) During the calendar year 1928, 254 cases were reported. (3) Two new sources of human infection were noted—muskrat and opossum. (4) Human serum and guinea pig tissue received from Sverdlovsk, Asiatic Russia, proved the existence there of tularaemia, thus adding a new continent to the area of known distribution. Reports from the basin of the Ural indicate that many cases contracted tularaemia from skinning the European water rat, or vole (*Arvicola amphibius*).

Researches on tularaemia conducted in the Rocky Mountain spotted fever laboratory at Hamilton, Mont., are reported on page 40.

Undulant fever.—Surg. H. E. Hasseltine was assigned to duty in field investigations on undulant fever effective February 23, 1929. These investigations include the collection of clinical and epidemiological data on the disease, in cooperation with State and local departments of health. Although this work has not progressed sufficiently to warrant definite report, much information bearing upon the public health problems connected with the disease has been obtained.

Acting Asst. Surg. A. V. Hardy is conducting investigations of the disease in Iowa, finding a number of cases in that State that apparently are due to the handling of infected swine, either on the farm or in packing houses.

Special Expert I. Forrest Huddleson spent the closing months of the fiscal year in Mediterranean countries making studies of the undulant fever of that region for comparison with similar studies made in this country.

Sera from State or municipal health departments and from other sources were tested on request for the agglutination reaction as an aid in the diagnosis of undulant fever, and a number of blood cultures were made for the same purpose. In a number of instances attempts were made to identify the type of the infecting organism.

Surg. Edward Francis, who carried on the work in the early part of the fiscal year, contracted the disease by laboratory infection in November, 1928, and Surg. W. T. Harrison acquired it in a similar manner in March, 1929.

Typhus fever.—Observations have been continued by Passed Asst. Surg. K. F. Maxcy upon the distribution, mode of transmission, and spread of endemic typhus in the southeastern United States. A strain of virus was obtained from a case in Wilmington, N. C., and successfully propagated in experimental animals and compared with strains of European and of Mexican typhus. Evidence has been presented which indicates that the endemic strain is identical with the Mexican, and that these differ slightly from the European typhus. These differences are not sufficiently great, however, to warrant the assumption that we are dealing in North America with a different disease, since an infection with either of the viruses affords to experimental animals an immunity to the others. It does permit, however, of the inference that the typhus which exists in the southeastern United States has common origin with the typhus of Mexico and is not dependent upon immigration from the typhus-infected countries of Europe.

It has been further demonstrated that after intraperitoneal inoculation of guinea pigs and white rats with the endemic virus, *Rickettsia*-like microorganisms, similar in all respects to the *Rickettsia prowazeki* (da Rocha Lima, 1918) found in infected lice, are present in the exudate on the surface of the tunica vaginalis of infected animals. It is possible that these microorganisms may be the cause of the disease. They have not yet been grown in artificial media.

Evidence that the endemic typhus of the southeastern United States is not dependent upon transmission by human lice continues to accumulate. Experiments with ticks and mites in the experimental transmission of the disease have been undertaken, but results are as yet negative.

Laboratory Attendant M. J. Mannix contracted typhus fever by laboratory infection and had a rather severe attack, but was convalescent at the end of the fiscal year.

Rocky Mountain spotted fever.—Investigations on this subject were continued under the direction of Surg. R. R. Spencer, and a report will be found under the field investigations of this disease, page 38.

Smallpox vaccination.—Data collected throughout the past year by Surg. Charles Armstrong support the earlier view concerning the determining influence of dressings in the development of the occasional cases of post-vaccinal tetanus following cutaneous vaccinations. Ex-

perimental work has been carried out and a paper was prepared dealing with the rôle of the dressing in the production of this complication.

Experimental studies have been made which indicate that the intradermal (injection) method of vaccination is potentially a dangerous procedure from the standpoint of postvaccinal tetanus.

During recent years complications of vaccination involving the central nervous system (other than tetanus) have attracted attention. Many and varied experimental attempts to produce postvaccinal encephalitis in rabbits have been made; and while suggestive results have been attained in a few animals, they have been difficult to duplicate. (On the whole, it is felt that but little in a positive direction has been attained.) The work is being continued in monkeys and rabbits.

The propagation of a heat-selected strain of vaccine virus, the latest transfer of which was with virus held at 37.5° C. for 37 days and 22 hours, is being continued.

Pneumonia.—The researches on pneumonia which have been pursued for a number of years at Bellevue hospital in New York City, as an assignment from this laboratory, were discontinued in October, 1928.

Poliomyelitis.—Studies on poliomyelitis were continued at Washington and in the branch laboratory at Rolla, Mo. No noteworthy progress has been made on this disease.

Trachoma.—The search for the etiological agent in trachoma has been continued throughout the fiscal year by Bacteriologist I. A. Bengtson at the Trachoma Laboratory in Rolla, Mo. The work has been mainly confined to the isolation of various microorganisms from the conjunctival lesions of trachomatous patients. The resulting cultures have been used in an effort to produce trachoma in experimental animals, especially the monkey. Conjunctival lesions have been produced in the monkey which simulate closely the trachoma lesion in man. However, the difficulty in both man and lower animals is to find some agreement on what actually constitutes the clinical entity which is designated as trachoma. The experimental work has not reached a stage which would justify an expression of opinion.

Meningococcus meningitis.—Early in the fiscal year indications of a considerable increase in the prevalence of epidemic cerebrospinal meningitis became evident, as well as an increase in virulence. Because of these facts it was considered advisable to undertake laboratory studies leading to the possible improvement in the therapeutic efficacy of the polyvalent sera used in the treatment of this disease. This work has engaged the attention of Associate Bacteriologist Sara E. Branham.

A large series of current strains of meningococci are being studied as to morphology, cultural characteristics, and their agglutinability with commercial polyvalent sera. A preliminary typing of each strain has been made, and confirmation of this typing by means of the absorption of agglutinins is being done. According to the information obtained thus far, type I is dominant, though all types are found. Type IV seems to be especially prevalent in some sections of the Middle West. Rabbits are being immunized with each new strain, both in order to determine its value as an antigen and in order to study the serological relationship existing between these new strains themselves, as well as their relation to the strains now used for the preparation of therapeutic sera. Those strains from each type which

prove to be the most broadly antigenic are being held for further intensive study. A few of the new strains have proved completely inagglutinable by all polyvalent and type sera examined. Particular attention will be given to this group. However, the majority of the current strains studied seem to be typical and are serologically represented in the sera used for therapeutic purposes, provided agglutination by these sera may be taken as a criterion.

PATHOLOGY

Work in the section of pathology has been carried on chiefly by Passed Asst. Surg. R. D. Lillie. During the past year the histological diagnostic service to the marine hospitals and other agencies has been continued; 632 specimens were examined and reports submitted. This represents an increase of 132 over the preceding year.

In addition to this diagnostic work, 379 histopathological specimens from experimental typhus, tularaemia, undulant fever, vaccinia, scarlet fever, streptococcus toxin lesions, nutritional diseases, and other conditions were examined for other members of the laboratory's research staff.

Sections have been prepared from 177 specimens for detailed study by various research workers in the laboratory. Some additional miscellaneous clinical laboratory examinations were made.

A study of the pathology of climatic bubo in man has been completed, and the report is now in press.

There follows a tabulation of the specimens examined in the division of pathology and bacteriology during the fiscal year:

A. Specimens of human origin:	
Division of hospitals and relief stations of the Public Health Service.....	571
Field investigations of Public Health Service.....	18
Other Federal agencies.....	7
In cooperation with State health agencies.....	20
Miscellaneous.....	16
Total human.....	632
B. Pathology of experimental diseases.....	379
Total.....	1, 011
Specimens prepared for other divisions but not examined in section on pathology.....	177
Total specimens prepared for histological examination.....	1, 188
C. Routine examinations and tests:	
Wassermann tests.....	2, 664
Tularaemia.....	566
Undulant fever.....	398
Diphtheria cultures.....	157
Urine.....	96
Water analyses.....	69
Cultures for identification.....	59
Milk samples for total count and <i>coli</i> count.....	40
Feces tested for typhoid, para A and B.....	36
Blood counts.....	36
Urine tested for typhoid, para A and B.....	34
Sera tested for typhoid, para A and B.....	31
Typhus.....	28
Miscellaneous.....	35
Total routine examinations and tests.....	4, 249
D. Total of all specimens examined.....	5, 437

CONTROL OF BIOLOGIC PRODUCTS, INCLUDING THE ARSPHENAMINES

Standardization of the scarlet fever biologicals.—Investigation of the methods used for testing the potency of scarlet fever streptococcus toxin and the antitoxin have been continued by the assistant director, Surg. R. E. Dyer. Efforts have been made to develop a new method for standardizing scarlet fever antitoxin which will eliminate the use of man as the test animal. Hartley's method of concentrating the streptococcus toxin has been employed in this work. This has permitted the preparation of a toxin which is lethal to rabbits in comparatively small doses. The results thus far obtained justify further work along this line.

Further experience with the standard unit for scarlet fever antitoxin in the comparative testing of antitoxins intended for the market has shown that the standardization of these products is now on as satisfactory a basis as is possible with the present method of testing. The American unit, which was originated by Surgeon Dyer, is now generally recognized in this country and is in use as a tentative standard in Europe.

Antipneumococcus serum.—The development of a more concentrated antipneumococcus serum has caused renewed interest in its use as a therapeutic agent. This has led to the necessity for further studies on standardization. The work has been carried on by Bacteriologist Alice C. Evans and has been designed primarily to determine whether the unit proposed by other workers is sufficiently well founded to warrant official adoption. The variations in results obtained by different workers has been so great that it is not considered wise for the present to adopt a standard for potency for this preparation. Perhaps the need for such a standard is not of pressing urgency, since the use of such serum for therapeutic purposes is still in the experimental stage.

Perfringens antitoxin.—A new supply of perfringens antitoxin serum was prepared, dried, and standardized during the year. Its distribution to manufacturers and others concerned is going forward. The testing was carried out by Bacteriologist I. A. Bengtson at the branch laboratory at Rolla, Mo.

Arsphenamines.—Routine testing of arsenical preparations has gone forward as usual and has indicated a very satisfactory quality of the products reaching the market. An extensive series of tests has been carried out on syphilis in rabbits with the object of determining whether the trypanocidal test affords any trustworthy basis for evaluation of the therapeutic efficacy of the material. The results so far as they have gone indicate lack of correlation between trypanocidal and treponemacidal activity.

Standardization of diphtheria toxin-antitoxin and diphtheria toxoid.—This work was begun in the previous fiscal year by Surg. W. T. Harrison. It has been continued during the present year primarily by Surgeon Harrison, later by Passed Asst. Surg. L. M. Rogers, and finally by Passed Asst. Surg. M. V. Veldee.

The immunizing qualities of samples of toxin-antitoxin mixture and toxoid were studied on children of grammar-school age. Some variation of the immunizing potency of the various products studied was noted.

Inspections.—The American establishments holding licenses for the manufacture of biologic products have been inspected during the fiscal year.

The following is a summary of the routine tests carried on at the laboratory during the year in the control of biological products:

Action on biological products

Product	Tested for sterility	Tested for potency	Released on manufacturer's protocols
Diphtheria antitoxin	37	67	0
Tetanus antitoxin	27	37	0
Scarlet fever streptococcus antitoxin	14	9	18
Erysipelas streptococcus antitoxin	7	0	0
Scarlet fever streptococcus toxin (Dick test)	5	1	2
Scarlet fever streptococcus toxin (immunizing)	11	1	2
Diphtheria toxin (Schick)	20	82	37
Diphtheria toxin-antitoxin mixture	128	113	117
Diphtheria toxoid	27	6	21
Antipneumococcic serum	30	34	0
Antimeningococcic serum	135	139	0
Antidysenteric serum	26	25	0
Miscellaneous serums	54	0	0
Vaccine virus	16	24	0
Rabies vaccine	26	7	0
Antityphoid vaccine	68	49	0
Miscellaneous vaccines	480	0	0
Tuberculin	52	0	0
Pollen extracts	55	0	0

Action on arsphenamine preparations

Product	Tested for toxicity	Tested for solubility and stability	Released on manufacturer's protocols
Arsphenamine	25	58	33
Nearsphenamine	118	339	221
Sulpharsphenamine	16	113	97
Silver arsphenamine	3	9	6
Sodium arsphenamine	2	3	1
Other arsenicals	8	21	13

NEUROPSYCHIATRIC STUDIES

The neuropsychiatric studies were discontinued in September, 1928, when Surg. Lawrence Kolb, who had been in charge of this work, was given a foreign detail.

DIVISION OF ZOOLOGY

The following work has been pursued by the Division of Zoology, under the direction of Prof. C. W. Stiles:

International Commission on Zoological Nomenclature.—Cooperation with the International Commission on Zoological Nomenclature has continued as in preceding years. The various governmental departments and various universities in the United States and in foreign countries have frequently referred questions to the Division of Zoology for opinion.

During the fiscal year 1929, the International Commission has issued 17 opinions on nomenclature, namely, Opinions 98–114. Of these, six opinions have a direct bearing in stabilizing nomenclature used in public health work.

Bulletins.—Hygienic Laboratory Bulletin 140, Key-Catalogue of the Protozoa Reported for Man, has been in such demand that the

edition was quickly exhausted and it has been necessary to issue a second edition.

Bulletin 152 on the Relation of Parasitic Diseases of Primate (apes, monkeys, lemurs) to the Diseases of Man is in press.

Two additional bulletins, one on the Diseases of Bats in Relation to the Diseases of Man and the other on the Diseases of Insectivora in Relation to the Diseases of Man, have occupied the Division of Zoology during a considerable portion of the year and are rapidly approaching completion.

Examination of intestinal parasites for diagnosis.—This part of the routine work of the division has been continued throughout the year; 307 specimens have been examined for various Government hospitals, State health departments, universities, and for practicing physicians.

THE DIVISION OF PHARMACOLOGY

The work of the Division of Pharmacology has continued under the direction of Prof. Carl Voegtlin.

Cancer studies.—The increased facilities made available at the beginning of the fiscal year lead to the organization and prosecution of researches of a fundamental nature which, it is anticipated, will require many years for their completion.

Since it is the present concept that cancer is essentially due to an abnormality of the growth of tissues, a correct understanding of the subject must be based upon the laws which govern tissue growth, both normal and malignant. Work has therefore begun with cultures of normal tissue (fibroblasts and heart tissue). This included a biochemical and cytological study of the various parts of the culture with particular reference to differences in physico-chemical behavior. The results obtained seem to indicate that the medium must be very carefully adjusted with regard to hydrogen-ion concentration and, what for lack of a better name, may be called the oxidative processes. If this adjustment is not optimal, the cells exhibit signs of degeneration or complete failure to grow. Other observations seem to indicate that these same factors are responsible for failure of growth of very small tissue fragments.

Another problem, which also appears to involve a factor of oxidation, dealt with the influence of glutathione (a cell constituent) on the preservation and possibly activation of the filterable agent obtained from a highly malignant chicken tumor (Rous sarcoma). It was found that the addition of relatively small amounts of reduced glutathione to a cell-free filtrate of this tumor had a favorable influence in preserving the malignant properties, so that injection of a small quantity of the material would result in a rapidly fatal disease in chickens, with malignant growth to be found not only at the place of inoculation but in many organs of the body.

The next problem dealt with the elucidation of the nature of the biological action of an electric field of very high frequency. The results clearly indicate that death is due, in the case of paramecium, to an increase in temperature. Experiments have shown that the heating effect essentially depends upon the conducting properties. As tissues and all cells readily conduct the electric current, it is not surprising to find that their exposure to the high-frequency field raises their temperature. Fundamentally therefore the cause of the action

of a high-frequency field upon these cells is the same as that which long has been used in therapeutics under the name of "diathermy."

In view of the fact that there is very little available knowledge concerning the factors which operate when living cells die from exposure to high temperature, a systematic research into this problem is in progress. Preliminary results indicate that heat death is dependent on certain factors, as the acidity, the concentration of certain salts, and acids.

Correlation of chemical and functional changes in living tissues.—The work was concentrated on improving the new vacuum tube voltmeter so as to make it into a static instrument. This was very essential, as experience showed that minute currents, which can not be detected by the most sensitive galvanometer known, will polarize the tissue and consequently change its chemical composition. As the instrument is to be used for chemical potential studies, it is obvious that only a truly static instrument will answer the purpose. The equipment was used in conjunction with blank platinum electrodes and with the so-called glass electrode. The latter is particularly well designed for the measurement of the hydrogen-ion concentration of biological material. A form of glass electrode was constructed which serves to make continuous measurement of pH in the circulating blood of animals. Numerous observations were made on the effect of asphyxia and of intravenous injections of acid and other substances on the potential changes of the blood and muscle in situ of living animals. The principal result obtained is that both blood and tissues are well buffered against changes in pH, but that marked alterations can easily be produced in the potentials governed by oxidative processes. The view that oxidations are the most important factor controlling the function of tissues gains more and more emphasis.

Mechanism of chemotherapeutic action of arsenic.—Progress was made on this subject, which is a continuation of work begun several years ago. It was necessary to improve the yield and purity of glutathione prepared from yeast. The product was partly used for the preparation of derivatives of inorganic and organic arsenicals. The fact that such compounds have now been made lends support to the theory elaborated in this division, according to which the toxin and therapeutic action of arsenic is due to its combining power with intracellular glutathione.

Improvements have also been made in the quantitative estimation of glutathione in tissues in the presence and absence of arsenic.

Pharmacological action of tuberculo-protein.—A systematic study of this subject yielded results which indicate that the injection of purified tuberculo-protein into normal and tuberculous animals has no immediate demonstrable pharmacological effect. Late effects, however, are present and consist in a pronounced fall of the mean arterial pressure. This is accompanied by a decrease in the sensitiveness of the vasomotor center. The functional peripheral vasomotor mechanism appears to remain intact.

Ergosterol.—The recent introduction of ergosterol into therapeutics has created a demand for information on the pharmacological action of this substance, particularly with regard to the dangers of over-dosage. It was shown that normal rabbits given repeated doses of 2 mg. may die from the drug. In addition to an increase in blood calcium, calcification was demonstrable in the aorta, the lungs, and

kidneys. These results are significant as showing that activated ergosterol, although undoubtedly a useful drug, is also endowed with the possibility of doing harm. Its medical uses should therefore be left to qualified physicians.

Preliminary experiments with tuberculous rabbits indicate that relatively small doses of ergosterol apparently lead to the calcification of some of the tubercles.

Biological assay of ergot.—Work on the biological assay of ergot has dealt with the comparison of the official method (cockscorn) and the isolated rabbit uterus method. With one exception the results obtained on a number of preparations have shown good agreement by the two methods.

Miscellaneous.—The chief of the division acted as consultant to the Chemical Warfare Service of the United States Army. He made a survey in Switzerland of the health hazards of workers engaged in the manufacture of luminous-dial watches, involving the use of radioactive substances. A short study was made of the dietary value of raw starch, which indicates that consumption of raw starch does not lead to a rise in blood sugar. This observation may possibly be of some value in the dietary treatment of diabetics.

Assistance was given to the United States Department of Agriculture in the enforcement of the food and drugs act, with reference to the regulation of the maximum permissible content of sulphur dioxide in dried fruits and the standardization of ergot preparations.

THE DIVISION OF CHEMISTRY

Senior Chemist H. D. Gibbs was Acting Chief of the Division of Chemistry until November 1, 1928. At that time Prof. Claude S. Hudson was appointed chief of the division. Following the appointment of Professor Hudson, the division was reorganized in preparation for some new investigations which are being pursued.

Specific tests for biologically important substances.—Application was made of the specific tests for cysteine and cystine, developed in the Division of Chemistry, to the estimation of these important sulphur-containing amino acids in isolated proteins, in normal foodstuffs, and in a survey of various tissues and glands of normal and diseased animals. Some 20 purified proteins have been analyzed. In some cases there was marked divergence from the findings of others who employed less specific tests. The findings indicate that leguminous foodstuffs of the genus *Phaseolus*, including the lima bean and the kidney bean, tend to be deficient in cystine—an amino acid which, as such or in complex with other amino acids, is of the highest importance in nutrition, in cellular respiration, in biochemical defense, and in the physiological activity of insulin, the pancreatic hormone regulating sugar metabolism. Marked differences were found in peptones used in bacteriological culture media. The results have been turned over to bacteriologists to determine whether the differences in cystine content of the peptones agree with difference in the growth and metabolism of bacteria-toxin production.

Attempts have been made, with a little success, to develop highly specific tests for guanidine with the object of applying these tests to certain diseased conditions involving the central nervous system.

Synthetic culture media.—As a corollary to work previously reported on the production of a gelatin-liquefying enzyme by *Proteus vulgaris*

in synthetic culture media, a general write-up and bibliography of the subject of synthetic culture media has been prepared.

Study of arsenicals.—The division continued the work of testing various commercial arsenicals of the arsphenamine group. In general, a high standard in chemical qualities of these compounds has been maintained.

Study of lead hazards.—The division continued its cooperation with Surg. James P. Leake in the investigation of lead hazards.

Sugar researches.—The part played by the carbohydrates, and by sugars in particular, in the welfare of man is exceedingly important with many points still to be studied and explained. To throw some further light on this interesting field of nutrition, a study has been made of rarer sugars and new derivatives of the more common sugars. From a trisaccharide, melezitose, found some years ago in certain kinds of honey, there is formed by treatment with weak acids a disaccharide. Several derivatives of it have been prepared in pure condition. Various new derivatives of the sugar rhamnose have been made, such as two crystalline lactones of rhamnonic acid and also rhamnonic amide. The new compounds were given a thorough study. Improvements have been made in the details of the cyanide synthesis of sugars and in the preparation of galactose and rhamnose. Means have been found to separate glucose and galactose by differential fermentation with brewer's yeast. The differential fermentability of the sugars shows the great influence that chemical structure and configuration have upon chemical compounds in relation to the material changes in the animal and plant kingdom.

Miscellaneous.—Assistance was given to the offices engaged in pellagra studies by analyses of feeding materials and by the preparation of active fractions of the antineuritic vitamin; to tuberculosis studies, by developing methods for the determination of calcium in tissues and the effect of irradiated ergosterol thereon. Thirty-three samples of morphine were examined for possible adulterants, and attention was given to methods of determining small quantities of iodine in foodstuffs. Some 640 miscellaneous analyses were made of a variety of substances, including water, blood, and urine.

VIRUSES, SERUMS, TOXINS, AND ANALOGOUS PRODUCTS

Supervision of the manufacture, importation, and sale of viruses, serums, toxins, and analogous products, authority for which was vested in the Public Health Service by the law of July 1, 1902, has been continued under the direction of the director of the Hygienic Laboratory, with Surg. W. T. Harrison in immediate charge.

At the close of the fiscal year there were 47 firms licensed under this act for the manufacture of 123 different biological products, including the arsphenamines.

A detailed account of the control of biologic products will be found on page 69.

MISCELLANEOUS

During the year 132 articles were received for review and recommendation before publication in the Public Health Reports, in supplements to the Public Health Reports, or in outside scientific journals. In addition, nine manuscripts for Public Health Bulletins and two manuscripts for Hygienic Laboratory Bulletins were sent to press and a third Hygienic Laboratory Bulletin was reprinted.

DIVISION OF DOMESTIC (INTERSTATE) QUARANTINE

In charge of Asst. Surg. Gen. W. F. DRAPER

PLAGUE-SUPPRESSIVE MEASURES IN CALIFORNIA

The same procedure in plague-suppressive measures has been followed as in the preceding year, and the work accomplished is best considered under the following divisions: (a) Plague in ground squirrels and control measures directed against these rodents; (b) Rodent surveys and sanitary inspections in San Francisco; and (c) Work performed in the United States Public Health Service laboratory.

PLAGUE IN GROUND SQUIRRELS

Plague in these rodents still exists as endemic foci in a number of counties in California; and if sufficiently intensive hunting operations could be carried out in the 14 counties in which plague foci have been previously demonstrated, it is believed it would be found that these foci of infection have been eradicated in very few of these districts.

During the year foci of plague in ground squirrels have been proved in the following counties: Alameda, Contra Costa, Monterey, San Benito, San Luis Obispo, Ventura, and Santa Barbara.

There occurred one human case of plague in Monterey County in July, 1928, and one case in Santa Barbara County in August, 1928.

The continuance of plague in ground squirrels over large areas in the central and coast counties south of Carquinez Straits constitutes a menace to the public health, and the outlook for eradicating plague in these rodents in California has not reached a hopeful stage.

FIELD OPERATIONS FOR CONTROL OF GROUND SQUIRRELS

The service work has been confined to the counties of Alameda, Contra Costa, San Francisco, and San Mateo. Close cooperation has been maintained with the horticultural commissioners in these counties, so that the respective activities would be coordinated and the work would not overlap. The districts assigned to the service employees in Alameda and Contra Costa Counties have been mainly around centers of population, and in San Mateo and San Francisco Counties all the squirrel-control work has been directed by Federal employees.

The joint activities in the counties specified have yielded excellent results, and the squirrel infestation has been markedly reduced. This applies particularly to the sections around the East Bay cities and towns.

Energetic measures have been continued by the horticultural commissioners in Alameda, Contra Costa, and Santa Clara Counties, and considerable control measures by poisoned grain have been carried out in Santa Cruz, Monterey, and other counties. While these measures are now being practiced more extensively than formerly

in many districts, the activities still fall short of the requirements for pronounced and lasting results.

The field operations are tabulated as follows:

Number of inspections.....	1, 134
Number of reinspections.....	4, 733
Number of acres inspected.....	282, 248
Number of acres reinspected.....	1, 449, 200
Number of acres treated with waste balls.....	31, 025
Number of acres treated with poison grain.....	238, 374
Number of burrows treated with carbon bisulphide.....	179, 539

Material used

Number of pounds of poisoned grain.....	106, 077
Number of gallons of carbon bisulphide.....	3, 006½
Number of waste balls used.....	179, 539
Poisoned barley mixed for private landowners under the supervision of employees of the service—number of pounds.....	1, 950

MEASURES TAKEN AGAINST RATS

The work carried out during the year relative to these rodents has been (a) the trapping and examination of rats; (b) the inspection of premises where rat infestation is reported; and (c) inspection and report on buildings that are insanitary, that constitute rat harborage, and may be a menace to public health.

Rat survey in San Francisco.—The survey by trapping and examination of rats in order to secure knowledge of any disease that might affect the public health has been continuous in San Francisco for several years. In this work six trappers have been engaged, two of whom are service employees and four are furnished by the city. This survey has been directed by the service at the request of the health officer.

The rats are examined in the Public Health Service laboratory in San Francisco. The classification of these rats is shown in the tabulated statement submitted with laboratory activities.

The results of the survey have been very satisfactory, and no evidence of plague infection was found in the 32,880 rats caught. Although the number of trappers was small, a fair sample of the rat population was obtained. Such a survey possesses decided advantages in any seacoast city, and particularly so in one that has previously had plague infection present in these rodents. The value far outweighs the nominal cost.

Rat survey in Oakland.—A limited survey has continued in Oakland during the year. The number of rats caught is small, but at the same time it furnishes some information whether plague exists in the rodent population. These rats are examined in the service laboratory.

The ratio of *Rattus rattus* and *Rattus alexandrinus* to *Rattus norvegicus* trapped in Oakland indicates that rat-proofing operations against the ground rat have not been carried out. This protective measure has never been prosecuted as it has in San Francisco.

SANITARY INSPECTIONS IN SAN FRANCISCO

These inspections fall in two classes. Reports of rats on premises are investigated and property owners are advised regarding the corrective measures necessary to render the premises free from rat in-

festation. Trappers are also assigned to trap rats in specific instances when the infestation warrants it.

The second class of inspections are those relating to buildings in an insanitary condition that may constitute a menace to the public health. Particular attention is given to buildings which constitute rat harborages. All complaints of insanitary premises which it is believed warrant condemnation proceedings are referred to this office for investigation and report.

These transactions are shown as follows:

Rat complaints investigated-----	881
Insanitary premises inspected-----	231
Number of buildings submitted to board of health for condemnation----	164
Number of buildings acted on by board of health and condemned-----	120
Number of buildings acted on by board of health and not condemned----	44
Number of buildings abated following condemnation proceedings (by repair, 2; by demolition, 161)-----	¹ 163
Number of buildings condemned and remaining unabated-----	55

OPERATION OF PUBLIC HEALTH SERVICE LABORATORY

The activities of the laboratory are based on the following work:

(a) Routine examination of rodents to determine if plague infection exists; (b) serological, bacteriological, and pathological work for service stations in the district; (c) service performed for other governmental agencies; and (d) special investigation of matters which may affect the public health.

An examination is made of rats trapped in San Francisco and Oakland. This is a daily routine work. Sometimes rats are trapped in centers where disease has been reported as occurring among rats, and in such instances a special laboratory investigation is made of rodents captured at such sites.

During the year no rats have been found suffering from anything suspicious of plague. Some affected with leprosy have been noticed; and the examination of those from a grain warehouse where a disease was prevailing proved that hemorrhagic septicemia was the disease causing the mortality among the rats.

Serological, bacteriological, and pathological examinations have been made for the stations of the service located in the fifth district. All the serological work required at the marine hospital, San Francisco, is carried out in the laboratory, also blood cultures and tissue mounting and examination for pathological conditions. This constitutes the bulk of the work of this character. However, practically all of the Wassermann examinations for the service station at San Pedro are made in the Public Health Service laboratory in San Francisco, and specimens from Nogales have also been examined.

The Public Health Service laboratory and the personnel engaged therein have cooperated with other service agencies at San Francisco in the examination of cultures for the detection of carriers on account of meningitis having occurred on vessels en route from the Orient to San Francisco.

A special investigation was made of the occurrence of meningitis in the detention barracks at the immigration station, Angel Island, with culture of the entire number of detained aliens for the purpose of

¹ These include some buildings acted upon during previous years; hence totals will not balance.

determining carriers. After the isolation of said carriers there was no further occurrence of meningitis in the barracks for a number of months and until the possible introduction of other carriers from aliens landed from vessels on which meningitis had occurred.

During the year the examination of samples of water used on interstate carriers has been an important activity. In addition to the examination of samples of water used on vessels, an examination has also been made of water used on railroad trains engaged in interstate traffic. This latter examination was formerly made by the State department of public health, but on account of an excessive amount of work they had to perform the Public Health Service laboratory has made a large part of these examinations, particularly those from small centers of population in the fifth sanitary district where trains secured water.

The work for other departments embraced the weekly examination of water samples from Yosemite National Park and also specimens of water from the Grand Canyon and Yellowstone National Parks.

Another agency that has utilized the laboratory to a greater extent than previously is the Indian Service. Examinations have been made of specimens of water for this service, and also serological and bacteriological work has been performed and report made to the physician of the Indian agency on cases in which the exact nature of the disease was in doubt. Some examinations of pathological specimens have also been made for some of the Indian reservations.

Another investigation was the continuation of the studies of dust nuisance as a health hazard in certain industrial plants in San Francisco that had been commenced during the preceding year.

The laboratory is an important unit in connection with service activities other than plague suppressive measures, and it should be maintained not only for this work but as a research center for public-health problems on the Pacific coast and adjacent territory. The importance of this unit justifies a proper laboratory building for its permanent installation.

The work performed in the laboratory is best shown in the following tabulated statement:

Classification of rats

Rats from San Francisco:	
<i>Rattus norvegicus</i>	27, 313
<i>Rattus rattus</i>	2, 595
<i>Rattus alexandrinus</i>	2, 972
Total.....	<u>32, 880</u>
Rats from Oakland:	
<i>Rattus norvegicus</i>	5, 005
<i>Rattus rattus</i>	54
<i>Rattus alexandrinus</i>	72
Total.....	<u>5, 131</u>
Rats from fumigated ships:	
<i>Rattus norvegicus</i>	7
<i>Rattus rattus</i>	957
<i>Rattus alexandrinus</i>	1, 137
Total.....	<u>2, 101</u>

Summary of laboratory operations

	Received	Examined
Examination of rodents for plague:		
Rats from San Francisco.....	32,880	27,081
Rats from Oakland.....	5,131	4,739
Rats from fumigated ships.....	2,101	2,089
Serological examinations:		
Wassermann reactions (blood).....	4,144	
Wassermann reactions (spinal fluids).....	67	
Serological examinations, Widal reactions.....	7	
Bacteriological examinations (culture and microscopic):		
Blood.....	3	
Feces.....	6	
Urine.....	2	
Miscellaneous.....	1	
Water.....	303	
Cultures for meningococcus.....	3,712	
Bacteriological examinations (with animal inoculations):		
Tuberculosis.....	20	
B. pestis.....	1	
Histological examinations, tissue blocks.....	181	
Agglutination test: B. tularensis.....	1	
Miscellaneous examinations:		
Autogenous vaccine.....	4	
Catgut, for sterility.....	5	

TRACHOMA ERADICATION WORK

The work of trachoma prevention as carried on may be grouped under the headings of treatment, public health education, and study of the disease from the clinical, bacteriological, and epidemiological viewpoints. In each of the three States, Kentucky, Tennessee, and Missouri, in which activities are now centered, a hospital is maintained for the treatment and study of trachoma, and each hospital is linked with the field by means of a full-time field worker. This is believed to be the most effective method of approach. The service of treatment and education must be brought to the patients, as the typical trachoma patient lives in a rural area and does not travel far. It is believed that the field work should be centered in a circumscribed area, such as a county, until practically all of the cases in that area have been found and at least instructed as to the dangers connected with the disease and the possibilities of relief. In Texas County, Mo., for example, a field nurse was maintained during the greater part of the fiscal year and 17 clinics were held. Thirty-two new cases were found and a total of 706 treatments given. During the previous year a similar series of clinics was held, with the discovery of 200 new cases. The work of the past year has indicated that all of the active cases in that county have been found and treated. In addition, the people have benefited by the public health instruction given by the field nurse.

General activities during the year have included participation in a survey of trachoma prevalence in the schools in areas adjoining Indian reservations in Montana. The results of this survey were published in an article in Public Health Reports by Dr. J. H. Crouch, State epidemiologist of Montana. Surveys were made in Oklahoma of Indian reservations at the request of the United States Indian Office, and a survey of trachoma prevalence in a small section of

southern Illinois at the request of the Illinois State Department of Health. Owing to a change in the personnel of the State health department, this survey was not completed.

Knoxville, Tenn.—On account of the fact that the building used by the hospital was sold and was to be torn down, it was necessary to find new quarters, and accordingly the hospital has been moved from 515 Locust Street to more commodious quarters at 1013 North Central Avenue. The building is larger, of better construction, and has better grounds than the previous location.

The experiment is being tried of placing a medical officer in the field for the purpose of conducting a field survey of prevalence and conducting trachoma clinics, both for the purpose of bringing cases under treatment and of getting as accurate information as possible of the prevalence of trachoma in the State of Tennessee. It is expected that after a year or so of this work enough data will be gathered to make it possible to outline a trachoma program in which it is expected the State health department will assume a major part. One of the field nurses was engaged in this State for about four months doing field survey and educational work.

Richmond, Ky.—This hospital has been very active since it was opened in 1926 and has been reaching trachoma sufferers in a wide area. Since April a field nurse has been maintained in eastern Kentucky, her activities being centered in Perry County. It is planned to continue her in that county as long as she continues to find a high prevalence of trachoma. Over 30 patients have already been sent to Richmond from this county due to the activities of the nurse and the two clinics which have been held at the county seat.

A great deal of interest in trachoma has been aroused among the public health workers in the counties surrounding Perry County, and a number of them, as well as several practicing physicians, have availed themselves of the opportunity of attending the clinics and learning more precise methods of diagnosis and treatment.

The recent establishment of county health units in counties where trachoma is prevalent has facilitated the field work and has made it possible to utilize these agencies for spreading knowledge regarding trachoma.

Rolla, Mo.—In spite of the addition of 10 beds to the capacity of the hospital at Rolla, it has not been possible to comply with all requests for treatment. A waiting list has been maintained throughout the year, and there seems no doubt that the hospital could be kept filled if it had twice its present capacity.

The field work during the past year was carried on largely in Texas County, 17 weekly clinics having been held. The field nurse investigated cases in all parts of the county, giving public health instruction and arousing interest in the clinic. A considerable number of the patients were given treatment at the clinic and many more were sent to the hospital. As a result of the intensive work which has been carried on for the past two years in this county, prevalence has markedly decreased. It is planned to take up a similar line of work in other counties.

The hospital possesses a Bausch & Lomb slit lamp and corneal microscope which have been utilized both for the study of the pathology of the cornea in trachoma and also as a means of administering ultra-violet light in treatment of corneal ulcers. Experiments have

also been conducted in the use of the ultra-violet light in the treatment of trachoma of the lids. Nothing conclusive can be reported as yet regarding the value of the latter, but in the treatment of corneal ulcers ultra-violet has a decided effect.

The facilities of the hospital have been, as heretofore, available to Bacteriologist I. A. Bengtson for supplying material for her bacteriologic study, and space has been provided in a building on the hospital grounds for housing some of her laboratory animals.

Epidemiology.—The epidemiological studies of trachoma conducted by Passed Asst. Surg. A. S. Rumreich have been carried on during the year, principally in Shannon County, which furnishes a somewhat different type of persons afflicted with trachoma. There is the added difference that very little trachoma-prevention work has been done in Shannon County, and there is thus offered a population with active untreated trachoma. These studies will be continued in the coming year.

Laboratory.—The laboratory work on the etiology of trachoma has been continued during the past year by Bacteriologist Ida A. Bengtson, laboratory quarters and facilities being furnished by the Missouri School of Mines and Metallurgy. Material for study is furnished by cases at the trachoma hospital. A further account of Doctor Bengtson's work is given in the report of the Hygienic Laboratory.

A statistical statement of hospital and dispensary transactions during the year follows:

Dispensary and hospital relief operations, etc., fiscal year ended June 30, 1929

	Knoxville, Tenn. ¹	Richmond, Ky.	Rolla, Mo.	Total
DISPENSARY RELIEF				
Old cases, all causes.....	1,428	426	1,093	2,947
Old cases, trachoma.....	1,280	350	838	2,468
New cases, all causes.....	439	329	691	1,459
New cases, trachoma.....	87	146	267	500
Total attendance.....	1,857	855	1,795	4,507
Average daily attendance.....	5.08	2.32	4.91	12.34
Impaired vision from trachoma.....	123	126	231	480
Corneal opacity from trachoma.....	34	96	138	268
Blindness both eyes from trachoma.....	0	1	3	4
Blindness one eye from trachoma.....	5	7	12	24
Ulcer from trachoma.....	20	23	47	90
Pannus from trachoma.....	51	119	228	398
Entropion from trachoma.....	4	38	98	140
Trichiasis from trachoma.....	1	29	74	104
HOSPITAL RELIEF				
Remaining from previous year.....	19	21	25	65
Cases admitted during the year.....	171	227	333	731
Discharged during the year.....	175	219	331	725
Remaining at close of year.....	14	29	27	70
Days relief furnished.....	4,765	6,655	9,098	20,518
Rations furnished.....	6,798	8,545	11,443	26,786
Cost of rations.....	\$2,340.73	\$3,200.27	\$4,288.22	\$10,029.22
OPERATIONS				
General anesthesia.....	0	9	1	10
Local anesthesia.....	127	103	283	513
Grattage.....	116	82	129	327
Entropion.....	4	21	59	84
Canthoplasty.....	5	6	63	74
Cautery puncture.....	2	0	22	24
Symblepharon.....	0	1	4	5
Pterygium.....	0	0	2	2
Evisceration.....	0	1	0	1
Blepharoplasty.....	0	0	4	4
Canthotomy.....	0	1	0	1
Keratotomy.....	0	0	1	1

¹ Closed to patients Mar. 16, 1929; opened Apr. 17, 1929.

Dispensary and hospital relief operations, etc., fiscal year ended June 30, 1929—
Continued

	Knoxville, Tenn.	Richmond, Ky.	Rolla, Mo.	Total
EDUCATIONAL WORK, HOUSE-TO-HOUSE VISITS, ETC				
Public talks given.....	0	6	1	7
People (estimated) in audiences.....	0	570	65	635
Pamphlets on trachoma distributed.....	225	280	1,226	1,731
House-to-house visits.....	4	48	221	273
People in houses visited.....	25	1,759	792	2,576
Trachoma cases in houses visited.....	4	211	189	404
Pupils examined in schools.....	319	34	428	781
Trachoma cases in schools.....	22	0	2	24

Field clinics

	Kentucky	Missouri	Tennessee	Total
Number of clinics held.....	2	25	10	37
Number persons examined.....	208	1,828	266	2,302
Trachoma cases found.....	198	1,687	76	861
Suspicious cases found.....	0	63	48	111
Operations performed.....	0	44	0	44
General anesthesia.....	0	0	0	0
Local anesthesia.....	0	44	0	44
Physicians present.....	8	29	24	61

¹ New trachoma cases, 50.

² New trachoma cases, 76; 25 of these at Kennett clinic.

Trachoma clinics, Houston, Texas County, Mo., July 7, 1928—May 4, 1929

	1928—July				1928—August				1928—September					1928—October		April 20, 1929	May 4, 1929	Total
	7	14	20-21	27-28	4	11	18	25	1	8	15	22	29	6	13			
Number of examinations.....	62	69	87	62	51	69	107	46	87	42	44	38	43	26	38	85	103	1,059
Positive trachoma diagnosis.....	26	32	48	30	29	35	42	29	45	16	21	16	19	13	23	30	45	499
Suspected trachoma cases.....	1	1	2	2	2	2	4	3	5	3	2	2	2	1	0	4	6	42
New cases of trachoma.....	1	2	1	1	0	2	5	2	4	0	0	2	0	0	2	3	8	33
Visits of returned cases.....	25	30	47	29	29	33	37	27	41	16	21	14	19	13	21	27	37	466
Treatments.....	46	52	56	38	38	48	64	34	64	28	27	20	24	15	34	62	56	706
Operations.....	0	0	14	11	0	0	0	0	0	0	0	0	0	0	0	0	0	25
Average attendance.....																		62.29

SANITARY ENGINEERING SECTION

At the beginning of the year a sanitary engineering section was organized in the division with Sanitary Engineer R. E. Tarbett in charge.

The engineering work formerly conducted in the interstate sanitary districts and the shellfish sanitation work have been combined under this section.

SUPERVISION OF WATER SUPPLIES USED BY COMMON CARRIERS

The cooperative plan between the State health departments and this service for the certification of water supplies used for drinking and culinary water on interstate carriers has been continued with increasing efficiency. One additional State organized a sanitary engineering bureau, leaving but four States without such service.

Service personnel assisted in the work in 11 States to the extent of 116 field surveys.

The following comparative tabulation of the percentages of completed certification is indicative of the progress made during the year:

	1926	1927	1928
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Railroad supplies.....	72	80	82
Vessel supplies.....	64	75	78

INTERSTATE RAILROAD WATER SUPPLIES

The following table covering the calendar year 1928 gives the status of this work by States:

Railroad supplies for calendar year 1928

State	Source classification				Certification status				Per cent sources acted upon
	Public (1)	Private (2)	Rail- road	Total	Satis- factory	Pro- hibited	Provi- sional	Action pending	
Alabama.....	38	2	3	43	43	0	0	0	100
Arizona.....	13	2	10	25	12	1	3	9	64
Arkansas.....	42	5	17	64	1	0	0	63	1
California.....	53	8	40	101	47	0	0	54	46
Colorado.....	30	2	9	41	29	0	11	1	98
Connecticut.....	13	0	0	13	11	0	2	0	100
Delaware.....	6	0	0	6	6	0	0	0	100
District of Columbia.....	1	0	1	2	2	0	0	0	100
Florida.....	44	3	7	54	54	0	0	0	100
Georgia.....	48	2	2	52	44	1	6	1	98
Idaho.....	16	2	8	26	25	0	1	0	100
Illinois.....	76	4	23	103	59	0	42	2	98
Indiana.....	54	1	14	69	35	4	23	7	90
Iowa.....	69	1	18	88	73	7	2	6	93
Kansas.....	82	1	11	94	80	3	1	10	89
Kentucky.....	34	11	15	60	47	0	5	8	87
Louisiana.....	32	6	15	53	50	2	0	1	98
Maine.....	32	3	8	43	39	0	0	4	91
Maryland.....	13	1	6	20	17	1	2	0	100
Massachusetts.....	41	0	0	41	41	0	0	0	100
Michigan.....	68	5	19	92	91	1	0	0	100
Minnesota.....	47	5	29	81	67	7	0	7	91
Mississippi.....	33	6	6	45	39	1	5	0	100
Missouri.....	63	3	13	79	50	12	13	4	95
Montana.....	20	2	10	32	31	0	0	1	97
Nebraska.....	38	0	21	59	55	0	0	4	93
Nevada.....	9	1	12	22	19	0	0	3	86
New Hampshire.....	20	0	1	21	21	0	0	0	100
New Jersey.....	35	0	3	38	36	1	0	1	97
New Mexico.....	9	0	15	24	23	0	1	0	100
New York.....	99	2	19	120	64	2	1	53	56
North Carolina.....	49	3	2	54	45	0	3	6	89
North Dakota.....	20	3	17	40	28	2	2	8	80
Ohio.....	74	3	18	95	88	4	0	3	97
Oklahoma.....	50	1	5	56	25	5	14	12	79
Oregon.....	34	3	9	46	36	0	0	10	78
Pennsylvania.....	135	6	16	157	62	2	0	93	41
Rhode Island.....	2	0	0	2	2	0	0	0	100
South Carolina.....	33	2	1	36	34	0	0	2	94
South Dakota.....	25	0	14	39	0	0	0	39	0
Tennessee.....	29	2	11	42	39	1	2	0	100
Texas.....	115	10	54	179	125	0	43	11	94
Utah.....	14	2	7	23	16	0	7	0	100
Vermont.....	13	1	2	16	15	0	0	1	94
Virginia.....	50	2	5	57	52	0	0	5	91
Washington.....	34	3	18	55	28	0	0	27	51
West Virginia.....	27	6	12	45	39	2	4	0	100
Wisconsin.....	52	17	13	82	71	2	0	9	88
Wyoming.....	12	0	6	18	0	0	0	18	0
Total.....	1,946	142	565	2,653	1,916	61	193	483	82

¹ The column headed "Public" includes supplies owned by municipalities as well as those used by municipalities but owned by private companies.

² A "Private" supply refers to a small well or spring used only by the carrier and the person owning it.

The percentage of travelers safeguarded from drinking impure water under the certification procedure is much larger than is indicated by the percentage of supplies certified, for the reason that the supplies of the larger cities from which water is taken are mostly approved, leaving only the small and oftentimes emergency supplies uncertified.

Coach yards and terminals have been inspected as time would allow, 294 such inspections having been made.

The joint committee on railway sanitation of the American Railway Association, on which the Public Health Service has three members, has continued its work on the study of acceptable devices and procedures relating to car watering and coachyard sanitation and expects to publish the results of this study in the near future.

INTERSTATE VESSEL WATER SUPPLIES

The certification procedure is also applied to water supplies used for drinking and culinary purposes on vessels engaged in interstate traffic where the water is taken from shore sources. The following table shows the status of this work by States for the calendar year 1928:

Vessel supplies for calendar year 1928

State	Source classification				Certification status				Per cent sources acted upon
	Public (1)	Private (2)	Company	Total	Satisfactory	Prohibited	Provisional	Action pending	
Alabama.....	3	0	0	3	3	0	0	0	100
Arkansas.....	3	0	0	3	0	0	0	3	0
California.....	20	4	0	24	14	0	0	10	58
Connecticut.....	8	0	0	8	8	0	0	0	100
Delaware.....	2	0	0	2	2	0	0	0	100
District of Columbia.....	1	0	0	1	1	0	0	0	100
Florida.....	12	6	1	19	19	0	0	0	100
Georgia.....	2	0	0	2	1	0	1	0	100
Illinois.....	8	1	0	9	6	0	2	1	89
Indiana.....	4	0	0	4	2	1	1	0	100
Iowa.....	1	1	0	2	1	0	0	1	50
Kentucky.....	8	0	0	8	5	0	3	0	100
Louisiana.....	7	2	3	12	10	1	0	1	92
Maine.....	10	0	0	10	10	0	0	0	100
Maryland.....	3	0	0	3	3	0	0	0	100
Massachusetts.....	11	0	0	11	11	0	0	0	100
Michigan.....	13	1	0	14	13	0	0	1	93
Minnesota.....	1	0	1	2	1	0	0	1	50
Mississippi.....	5	1	0	6	6	0	0	0	100
Missouri.....	3	0	0	3	1	0	1	1	67
New Hampshire.....	1	0	0	1	1	0	0	0	100
New Jersey.....	12	2	1	15	15	0	0	0	100
New York.....	14	3	0	17	7	0	0	10	41
North Carolina.....	5	2	1	8	5	0	3	0	100
Ohio.....	11	0	0	11	11	0	0	0	100
Oregon.....	8	3	0	11	7	0	0	4	64
Pennsylvania.....	8	1	0	9	1	0	0	8	11
Rhode Island.....	3	0	0	3	3	0	0	0	100
South Carolina.....	2	0	1	3	3	0	0	0	100
Tennessee.....	3	3	0	6	6	0	0	0	100
Texas.....	7	8	0	15	11	0	3	1	93
Vermont.....	1	0	0	1	1	0	0	0	100
Virginia.....	12	0	2	14	10	0	0	4	72
Washington.....	22	7	1	30	13	0	0	17	43
West Virginia.....	6	0	0	6	5	0	1	0	100
Wisconsin.....	3	1	0	4	3	0	0	1	75
Total.....	243	46	11	300	219	2	15	64	78

¹ The column headed "Public" includes supplies owned by municipalities as well as those used by municipalities but owned by private companies.

² A "Private" supply refers to a small well or spring used only by the carrier and the person owning it.

SUPERVISION OF WATER-SUPPLY SYSTEMS ON VESSELS

The inspection of vessel drinking and culinary water-supply systems and purification systems has been continued and considerable improvement has taken place. Three hundred and thirty-seven first inspections of vessels were made with 1,046 reinspections.

The following table gives the status of this work for the calendar year 1928:

Vessels for calendar year 1928

District	Vessels on active status	Per cent of total vessels in district	Certification ¹			Per cent of district vessels certified	Per cent of total vessels certified
			Permanent	Temporary	Total		
1-----	860	35	125	267	392	45.6	15.9
2-----	128	5	81	8	89	69.5	3.6
3-----	643	26	143	363	506	78.7	20.6
4-----	366	15	4	82	86	23.5	3.6
5 and 6 (combined)-----	463	19	109	163	272	58.7	11.1
Total-----	2,460	-----	462	883	1,345	-----	54.6

¹ Only the latest certificate issued on a vessel was counted in case that vessel was both temporarily and permanently certified during the year.

SHELLFISH SANITATION

The Shellfish sanitation work has been carried on as outlined in previous reports except that this work has been included in the activities of the Interstate sanitary districts instead of being conducted as a separate activity. Twenty States have now assumed sanitary control over their shellfish industry and are cooperating under the plan recommended by the committee on sanitary control of the shellfish industry.

A cooperative laboratory study of the Maurice River (N. J.) area was made with the New Jersey State Department of Health.

A small amount of laboratory work on methods of scoring was carried on during the period April to June, inclusive.

Certificates issued shellfish shippers by State authorities and approved by this Service for shipment in interstate commerce totaled 1,600. Lists of these certified shippers were published and supplied to State and municipal health officers and others concerned. The shellfish sanitation work is described in detail in the reports of the interstate sanitary districts which follow.

PUBLIC HEALTH ENGINEERING ABSTRACTS

The publication of public health engineering abstracts in mimeograph form has been continued throughout the year, a total of 345 pages, covering abstracts from 105 domestic and 78 foreign publications, being issued. The increasing reference in the engineering literature to these abstracts, as well as the increased demand for copies, has indicated their value.

The following table gives the status of the publications for the present year in comparison with the three preceding years:

	Fiscal year ended June 30—			
	1926	1927	1928	1929
Publications available.....	92	129	116	207
Abstracts.....	79	78	85	87
Weekly issues.....	52	52	53	52
Articles abstracted.....	542	762	896	1,426
Mailing list.....	491	635	684	835

COOPERATIVE SANITARY WORK

Cooperation with other Government bureaus in sanitary work has been continued during the year.

Arrangements were made at the request of the Superintendent of Federal Prisons for an inspection of sanitary conditions and sanitary devices at the five penal institutions, together with professional advice on matters of sanitation and sanitary engineering. These inspections were made during the year.

Work in the national parks and Indian reservations has continued and is discussed in detail under the work of the districts. A total of 372 engineer days were devoted to national park work and 223 days to Indian reservation work.

Due to emergency conditions caused by the storm in Porto Rico, one engineer was assigned to assist the American Red Cross for a period of one month. One investigation was made in connection with the United States Forest Service and one at the request of the Coast Guard. Various investigations other than those included in the regular work were made for other divisions of the Public Health Service and for certain States and cities. A total of 744 engineer days were devoted to such cooperative sanitary work and this work has resulted in appreciable savings to the governmental agencies involved.

The following table gives the distribution of time in days of the field personnel during the fiscal year 1929:

Distribution of time in days of the field personnel, under the Engineering section, fiscal year 1929

Interstate quarantine:	
Office.....	1,577
Field—	
Water.....	1,297
Shellfish.....	421
National parks:	
Office.....	240
Field.....	132
Indian Service:	
Office.....	198
Field.....	25
Miscellaneous:	
Office.....	33
Field.....	68
Technical meetings.....	48
Leave.....	280

INTERSTATE SANITARY DISTRICTS

SANITARY DISTRICT NO. 1—MAINE, NEW HAMPSHIRE, VERMONT, MASSACHUSETTS, RHODE ISLAND, CONNECTICUT, NEW YORK, NEW JERSEY, AND PENNSYLVANIA

Sanitary Engineer L. M. Fisher was in charge of the district during the year, assisted by Associate Sanitary Engineer I. W. Mendelsohn. The activities carried on are grouped as follows: (1) Shellfish sanitation, (2) vessel water-supply and sanitation supervision, (3) railroad water-supply and sanitation supervision, (4) miscellaneous activities, (5) cooperation with State health departments in the certification of sources of water supplies used by interstate carriers, and (6) cooperation with local health departments and Federal agencies in solving special health problems.

SHELLFISH SANITATION

Shellfish sanitation was made a regular part of the district work during the year in addition to the former activities. All of the States in this district except Vermont are engaged in the production and marketing of shellfish.

Assistance was rendered the State authorities in Maine in setting up suitable machinery for the certification of shellfish in that State. This is the first year that certificates have been issued in Maine. The procedure became necessary because of the fact that the principal States to which the product is shipped refused longer to accept the shellfish, principally soft clams, without State certificates and their approval by the Public Health Service.

The shellfish problem in this district is different from that in any other section of the country in that the activities during the summer season are nearly as great as during the winter months, due to the large trade in both hard and soft clams.

Following a conference held in Philadelphia early in December, 1928, at which representatives of the State Department of Health of New Jersey and members of the shellfish industry of that State were present, a plan was evolved for a study of the sanitary condition of oysters placed in water storage during periods when the water temperature was below 5° C. A joint investigation was conducted by the Public Health Service in cooperation with the State Department of Health of New Jersey and the New Jersey experiment station in the study of water storage of Delaware Bay oysters at Long Reach in the Maurice River. A field laboratory was established at Bivalve, N. J., in quarters occupied by the New Jersey biological station, and the problem was intensively studied for approximately three months. Laboratory Aide C. C. Fletcher was assigned to this work.

A large number of oyster samples were examined, both before being placed in wet storage and during various periods of storage. Numerous water samples were taken in the river where the oysters were stored and at upstream stations. As a result of the investigation, certain improvements were instituted by the State which further improved the sanitary quality of river water in that section used for wet storage.

Assistance was rendered the special shellfish commission of Massachusetts in their investigation of the sanitary control of the shellfish

industry in the States on the eastern seaboard as far south as Virginia. Special hearings held by this commission in Massachusetts were attended at the request of the commissioner, and information was furnished with reference to the procedure of the Public Health Service in matters of shellfish certification.

The conditions under which soft clams are shucked and prepared for market at points on the New England coast were improved as a result of the activities of this office. It was found necessary to withhold approval of State certificates as long as the preparation of this product was carried on in private kitchens, under conditions which made supervision and inspection extremely difficult and impracticable.

Assistance was rendered the State of Rhode Island in its efforts to break up the practice of certain unscrupulous shellfish dealers of disposing of hard and soft clams obtained from polluted areas in other States.

The Public Health Service was requested to give provisional approval of a chlorination plant for treatment, under strict State supervision, of soft-shelled clams taken from moderately polluted areas. No definite approval was given, but the municipality and the State concerned were encouraged to work out a satisfactory solution along these lines, since it would solve the difficult problem of preventing contaminated clams from reaching the market surreptitiously and would provide a means of supervising the marketing of clams coming from moderately polluted areas. Unfortunately, the plant was not constructed on a sufficiently large scale to make it a paying proposition, and the project has been temporarily abandoned. It is believed that progress will be made along these lines and that a satisfactory method will be evolved making available large quantities of shellfish now excluded from the market because of the restrictions placed upon the growing areas due to excessive pollution.

In most of the States the floating of shellfish has been discontinued, but in one of the States in this district the process under State supervision is still in effect. Additional safeguards, arrived at jointly by service representatives and the State concerned, were applied to the process in an endeavor to protect shellfish consumers.

Complaints were received regarding illness alleged to have been caused by contaminated clams, and in cooperation with the State authorities involved investigations were made which proved that the complaints were not well founded, the illness in all probability having been due to other causes.

A total of 601 shellfish certificates issued by the States in this district were approved.

SUPERVISION OVER VESSEL WATER SUPPLY SYSTEMS AND SANITATION

The records show that there are approximately 800 vessels listed in this district as coming within the interstate quarantine regulations. Of this number, 525 had never been inspected for compliance with the regulations. A special effort was made during the year to reduce this number of uninspected vessels. On many of these vessels conditions requiring correction were found; on others conditions were fairly satisfactory.

Excellent cooperation was received from the vessel companies. A number of the large companies voluntarily offered to make such

changes as were necessary in the water systems of all vessels in their fleet, this work to proceed as rapidly as opportunity afforded. As corrections are made this office is notified and the vessels are reinspected.

Arrangements were completed with State and local health authorities whereby samples of drinking-culinary water from vessel water supplies are examined and the results reported to this district. Such arrangements were perfected with the States of Vermont, Massachusetts, Rhode Island, and the cities of Portland, Me., and New York, N. Y. A series of samples were also collected by the service inspector and examined in the New York City laboratories. In addition to these, examinations were made of water samples submitted by the United States Shipping Board to the laboratory at the marine hospital at 67 Hudson Street, New York. The quality of drinking water found aboard vessels as indicated by these examinations was satisfactory. In but one instance was the Treasury Department standard not reached. In one instance the routine test for chlorine content was high and indicated that salt water might have found its way into the drinking water.

There has been cooperation with the chief engineer of the Canadian health department in efforts to induce certain foreign vessel companies operating on the Great Lakes to comply with the Canadian and American regulations concerning vessel water supplies.

Summary of vessel water supply supervision

Inspections:		Certificates issued—Continued.	
First inspections—		Temporary—	
Passenger.....	19	Passenger.....	34
Freight.....	85	Freight.....	345
Total.....	104	Total.....	379
Reinspections—		Major conferences:	
Passenger.....	127	With shipping officials.....	38
Freight.....	86	With others.....	13
Total.....	213	Total.....	51
Certificates issued:		Water examinations made:	
Regular, favorable—		At United States marine hos-	
Passenger.....	68	pital.....	32
Freight.....	71	At State and city labora-	
Total.....	139	tories.....	63
		Total.....	95

During the fiscal year 59 cases of typhoid fever among passengers and crews on vessels having their headquarters within this district were reported from the hospitals and quarantine stations of the service or by State and local health authorities. Of this number, all but 39 were clearly contracted elsewhere than aboard ship, and of the 39 the evidence was not at all conclusive that the infection was acquired aboard.

One instance merits special mention. An American vessel plying between New York and ports in California had two cases of typhoid fever, one of which was fatal. The investigation disclosed that the drinking-water supply system was cross connected at several points with the boiler-feed system. The vessel was reported to have obtained

overboard water from the Schuylkill River and from Lake Gatun in the Panama Canal. Examination of the water in the vessel's tanks showed that it was grossly contaminated. The possibility that the infection might have been acquired ashore remained, but there was a strong likelihood that the infection was obtained aboard ship.

As a result of this occurrence, the dangers attending the practice of maintaining cross connections between the drinking-water supply systems and the other vessel water systems were brought to the attention of shipping companies in a circular letter, the replies to which showed that the shipping companies were anxious to avoid such occurrences, and also revealed that nearly all shipping companies in this district use fresh water of drinking water quality for all purposes.

Summary of typhoid fever cases from vessels in sanitary district No. 1

	Fiscal year					
	1924	1925	1926	1927	1928	1929
Cases reported by U. S. marine hospitals and quarantine stations.....	55	84	30	18	20	24
Cases reported by local health departments.....	28	27	21	34	40	35
Cases involving passengers.....	16	14	6	6	25	23
Cases involving crew.....	67	97	45	46	35	36
Foreign-owned vessels involved.....	20	22	14	17	26	28
American-owned vessels involved.....	36	72	28	24	27	26
United States Shipping Board vessels involved.....	5	5	3		3	1
Other Government-owned vessels involved.....	6	5		3	1	
Cases involving vessels operating in interstate traffic.....	17	28	25	11	28	25
Cases involving vessels operating on foreign traffic.....	49	57	26	32	32	34
Vessels having more than 1 case.....	5	15	5	3	3	2
Average number of cases per vessel.....	1.24	1.18	1.13	1.18	1.05	1.04

RAILROAD WATER SUPPLY AND SANITATION SUPERVISION

Much time was given to the work of the subcommittee of the joint committee on railway sanitation of the American Railway Association. A large amount of data resulting from the questionnaire which was sent out in 1928 was analyzed and tabulated for the subcommittee. A number of inspections were made of coach yards and terminals, principally to obtain information for the committee. Where it was obvious that certain improvements would result in bettering conditions suitable recommendations were made to the railroad companies concerned. At the close of the fiscal year a large amount of work remains to be done, although much progress has been made in the preparation of a pamphlet or manual of recommended practices. The greater part of this work was done by Associate Sanitary Engineer Mendelsohn, serving as secretary for the subcommittee.

At the time of the severe water-borne typhoid fever outbreak at Olean, N. Y., an investigation was made to ascertain whether or not railroads obtaining drinking water at that point were taking the necessary precautions to safeguard the health of interstate travelers. The investigation disclosed that as soon as the water supply came under suspicion adequate precautionary measures were instituted by obtaining drinking water at other watering points and by steaming out the systems that might have become contaminated from water taken on at Olean.

Summary of railroad drinking water supply supervision

Inspections:		Major conferences:	
Coach yards.....	33	With railroad officials.....	20
Terminals.....	6	With others.....	4

MISCELLANEOUS ACTIVITIES

Assistance was rendered the service engineer detailed to Porto Rico with the Red Cross relief expedition by gathering at the port of New York water-chlorinating machines and cylinders of chlorine gas furnished by a manufacturing concern without cost; securing a supply of halazone tablets for sterilizing small quantities of drinking water; securing detailed information relative to water supplies on the island; and supplying mimeographed directions for treating wells and reservoirs.

Assistance was rendered the Connecticut State Health Department in breaking up the practice of discharging garbage and sewage in the vicinity of resort places on the Connecticut coast by certain excursion boats from New York City.

The district engineer, at the request of the Rhode Island State Board of Water Purification, gave testimony as to the effect that the continued discharge of sewage into tributaries of Narragansett Bay would have upon the safety of shellfish grown in the bay. The board is engaged in a systematic effort to reduce the amount of sewage pollution now reaching the waters of Narragansett Bay.

An investigation was made at the Coast Guard station on the Isles of Shoals off the New Hampshire coast to ascertain what steps, if any, could be taken to improve the water supply at that station. Examinations of samples at various times in the past have indicated that the supply receives a certain amount of contamination. A report with recommendations was submitted on this subject.

At the instance of the Division of Venereal Diseases data with reference to the number of sailors on American vessels at the port of New York and the efforts now being made to reduce the prevalence of venereal disease among sailors were obtained from various shipping companies with headquarters at New York. Assistance was also rendered certain companies in instituting prophylactic measures aboard their vessels and in supplying pamphlets and posters to shipping companies when opportunity afforded. A number of the larger shipping companies with headquarters in this district have expressed a willingness to cooperate with the Public Health Service in its efforts to reduce the prevalence of venereal disease among merchant seamen.

The district engineer served as the bureau representative on the committee on specifications for household refrigerators, American Standards Association.

DISTRICT NO. 2—DELAWARE, MARYLAND, VIRGINIA, WEST VIRGINIA,
DISTRICT OF COLUMBIA, NORTH CAROLINA, SOUTH CAROLINA, GEORGIA,
AND FLORIDA

PERSONNEL AND ACTIVITIES

During the year, the activities of interstate sanitary district No. 2 were under the direction of Associate Sanitary Engineer Arthur P. Miller, assisted by Junior Assistant Sanitary Engineer J. L. Robertson. On July 13, Junior Assistant Sanitary Engineer O. C. Hopkins

was assigned to the station and was placed in charge of the branch office at Atlanta, Ga., continuing there until November 30, when he was transferred. In his place, Laboratory Aide C. C. Fletcher was assigned to this office and was given charge of a branch office at West Norfolk, Va.

Arranged in order of importance, the activities of this office may be divided as follows: (1) Sanitation of shellfish, which includes joint investigations with State authorities of shucking houses and shellfish-growing areas and cooperation with those authorities in solving special problems and difficulties; (2) inspection and supervision of water-supply systems, storage facilities, and all other sanitary appurtenances on interstate carriers; (3) investigation of the methods and devices used by railroads in watering cars; (4) cooperation with State health departments in matters jointly affecting them and the Public Health Service, such as water and milk supplied on common carriers; and (5) assisting other Government departments and bureaus, among which are included the Forest Service, Office of Indian Affairs, and the Office of the Superintendent of Prisons.

SHELLFISH SANITATION

That this activity is a major one for this station, particularly during the period from September to April, is indicated by the following table, which is based on data given in Technical Bulletin No. 64 of the United States Department of Agriculture:

Oyster production of the United States

	Quantity in bushels per annum
Interstate sanitary district No. 1.....	4, 638, 620
Interstate sanitary district No. 3.....	0
Interstate sanitary district No. 4.....	3, 311, 595
Interstate sanitary districts Nos. 5 and 6.....	84, 712
Total produced in all districts except No. 2.....	8, 034, 927
Total produced in interstate sanitary district No. 2.....	10, 005, 781

It will be noted that oyster production in this district exceeds that in all the other districts together.

In the main the procedure followed in cooperative work with States is the same in each. Joint inspections of shucking houses are made, and when studies of areas are contemplated this office usually takes part in them. Occasionally investigations are made without a State inspector, but in all instances a complete and comprehensive report of our work in any particular State is given to the proper State agency. It is impossible, owing to lack of sufficient personnel, to inspect every shucking house in the district and to take part in each field investigation made by State officials. However, sufficient work is done in each State to permit the formation of an opinion as to the effectiveness of the State machinery.

North Carolina, South Carolina, and Georgia have changed their certification procedure from a continuing basis to an annual one. This is a desirable practice in States where the number of shucking houses is not so great as to preclude inspection of all before the open-

ing of the season. In Georgia it was recommended that the shellfish work be transferred from the department of agriculture to the department of health. Failing to obtain that transfer, the district engineer insisted that the State department of agriculture equip itself with personnel capable of doing sanitary work. In this complete cooperation was obtained and that department placed on duty a sanitary engineer recommended and trained by the service.

Certain conditions relating to the interstate shipment of shellfish by noncertified dealers in Florida were uncovered and pointed out to the State authorities. In all other States activities continued without any unusual occurrences.

States have been asked to report on inspections of shucking houses at least once each month. The following table shows the degree of cooperation received:

Number of separate reports on shucking-house inspections from States

State	1928				1929			
	September	October	November	December	January	February	March	April
Delaware.....	1	1	1	1	1	0	0	0
Florida.....	0	1	1	1	1	1	0	0
Georgia.....	1	1	1	1	1	1	1	1
Maryland.....	1	6	7	3	5	8	1	0
North Carolina.....	0	1	1	1	2	1	1	0
South Carolina.....	1	1	1	1	1	0	1	0
Virginia.....	1	1	2	2	1	1	1	1

The number of shucking-house inspections made by State authorities and reported to us is as follows:

Number of shucking-house inspections as reported by States

State	1928				1929				
	Septem-ber	October	Novem-ber	Decem-ber	Janu-ary	Febru-ary	March	April	Total
Delaware.....	0	9	9	1	9	0	0	0	28
Florida.....	0	17	17	17	20	16	0	0	87
Georgia.....	45	34	45	83	82	93	105	76	563
Maryland.....	39	295	179	211	228	245	94	0	1,291
North Carolina.....	0	26	22	19	38	17	17	0	139
South Carolina.....	16	27	17	19	25	0	28	0	132
Virginia.....	52	157	176	156	210	79	110	12	952
Total.....	152	565	465	506	612	450	354	88	3,192

These data should be considered in the knowledge that the shellfish season does not begin at the same time in every State, nor does it close automatically at the same time in these States. The figures include all inspections during the particular period noted and represent the number of shucking houses inspected. In other words, if the same shucking house was inspected 10 times during the month, those 10 inspections would be included in these figures.

The following table gives the inspections made by this office:

Number of shucking-house inspections made by Public Health Service personnel

State	1928				1929			
	September	October	November	December	January	February	March	Totals
Delaware.....	0	0	0	0	9	0	0	9
Florida.....	0	0	15	0	18	0	0	33
Georgia.....	0	0	12	10	0	0	0	22
Maryland.....	0	0	0	0	0	94	0	94
North Carolina.....	0	0	12	0	0	13	0	25
South Carolina.....	0	0	23	0	0	0	7	30
Virginia.....	6	6	0	0	0	0	28	34
Total.....	0	6	62	10	27	107	35	247

In the following table an effort was made to determine the number of inspections per house per month in each State. In doing this it had to be assumed that the shellfish season in each State ran through the period of September, 1928, to March, 1929, inclusive. It is recognized that these figures, therefore, are subject to certain inaccuracies, but a general idea can be gained by comparing the final results as to the extent of inspectional work done by the States.

Number of inspections of shucking houses by States reduced to "per house per month" basis

State	Total inspections for period September to March	Inspections per month	Certificates in force on May 1	Inspections per house per month
Delaware.....	28	4.0	9	0.4
Florida.....	87	12.4	22	.6
Georgia.....	487	69.6	44	1.6
Maryland.....	1,291	184.4	237	.8
North Carolina.....	139	19.9	90	.2
South Carolina.....	132	18.9	35	.5
Virginia.....	940	134.3	342	.4
Total.....	3,104	443.4	779	.6

In general, restricted areas remained the same, although there were a few changes, especially in Virginia.

A number of conferences were held with city health authorities relative to the adoption of suitable shellfish ordinances, obtaining compliance with these in effect, and increased activity in seeking sellers of shellfish from unapproved sources. Contacts were made on several occasions with officials of the Food, Drug, and Insecticide Administration of the Department of Agriculture.

VESSEL WATER-SUPPLY AND SANITATION SUPERVISION

Competition with freight trucks and passenger busses is becoming too keen for the old-time river and bay lines along the South Atlantic coast. As a result a number of them are going out of business, others are tying up their boats, and others are selling them. Quite a few of the old lines have been dropped this year. At the beginning of the year there were on our active records 46 companies owning 136

vessels, while at the close of the year there were but 40 companies with 124 vessels. Generally speaking, however, the larger companies remain quite constant in the number of vessels operated. No particular difficulties were met with during the year in this work. No inspector was on duty during the summer months in the early part of the year, as in the past, and hence the work was accomplished over the whole year rather than during that period. The method of inspecting vessels during the summer is preferable, and hence an inspector was obtained during the latter part of June.

Special effort was made to call on the local offices of the Steamboat Inspection Service, and contacts were made at Jacksonville, Savannah, and Norfolk.

During the year 94 inspections of vessels were made; of these 9 were first inspections and 85 reinspections. Eight noncompliance notices were issued, four more than last year.

TABLE NO. VI.—*Summary of vessel inspection work*

Activity	Passenger	Freight	Passenger and freight	Water boats	Total
Inspections:					
First inspections.....	2	2	3	2	9
Reinspections.....	13	8	60	4	85
Certificates issued:					
Temporary.....	5	8	9	4	26
Regular (favorable).....	14	7	55	5	81
Regular (unfavorable).....	0	0	0	0	0
Noncompliance notices.....	3	3	2	0	8

The number of cases of typhoid fever reported was the same as last year, namely, five. These were distributed over five vessels and were not attended by any unusual circumstances.

Cooperation was continued with shipbuilding companies in the review of plans for new vessels and with city health departments in the testing of water samples taken from vessels. In the latter work, Norfolk, Va., is credited with having made 22 tests and Wilmington, Del., with 16.

RAILWAY SANITATION

Late in the year this office inaugurated a phase of work never before done in this territory, namely, investigation of the methods and devices followed and used by railroads to supply drinking water to coaches, diners, Pullmans, and other cars. This work was considered very important at this time because of the activities of the joint committee on railway sanitation of the American Railway Association.

Before the end of the year, rather extensive inspections were made of the facilities along the Chesapeake & Ohio Railway and the Southern Railway System, 35 watering points being covered in the States shown:

Florida.....	1	South Carolina.....	4
Georgia.....	6	Virginia.....	9
North Carolina.....	7	West Virginia.....	8

This work should be distinguished from the inspection of coach yards. No attempt was made to study sanitary conditions in coach yards or terminals except in so far as these conditions related to or

affected car watering. Full reports on these investigations were made to the common carriers concerned, especial attention being given to a pictorial section in the reports. Two representative pictures are shown here.

COOPERATION WITH OTHER GOVERNMENT BUREAUS

At the request of the United States Forest Service, the district engineer took part in a meeting between that service, State health authorities, and city officials at Staunton, Va., relative to the watershed of Staunton's public water supply, which is in a national forest.

In accordance with arrangements completed with the Superintendent of Prisons, Department of Justice, complete inspections were made of the Federal penitentiary at Atlanta, Ga., and the Federal Industrial Institution for Women at Alderson, W. Va. In each case constructive reports were submitted. Work incident to carrying out recommendations in each report is now going forward.

An investigation was made also of the Cherokee Indian Reservation at Cherokee, N. C. This work was done under the cooperative agreement between the Public Health Service and the Office of Indian Affairs.

COOPERATION WITH STATE HEALTH DEPARTMENTS

During the year conferences were held and joint work done with State health authorities. A number of visits were made to each State in this district.

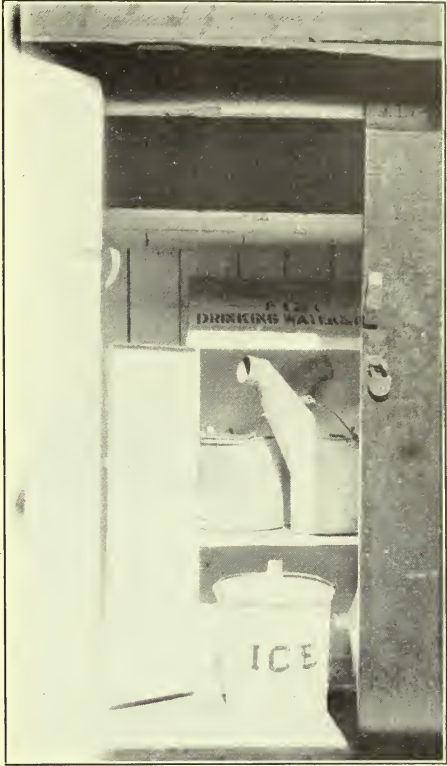
At the request of the State a part was taken in a meeting at Asheville, N. C., held to discuss the milk situation there.

Special efforts were made to attend meetings held for the purpose of considering problems of water and sewage disposal. This office was represented at such meetings in Maryland, North Carolina, South Carolina, and Virginia. In addition the annual convention of the American Waterworks Association was attended.

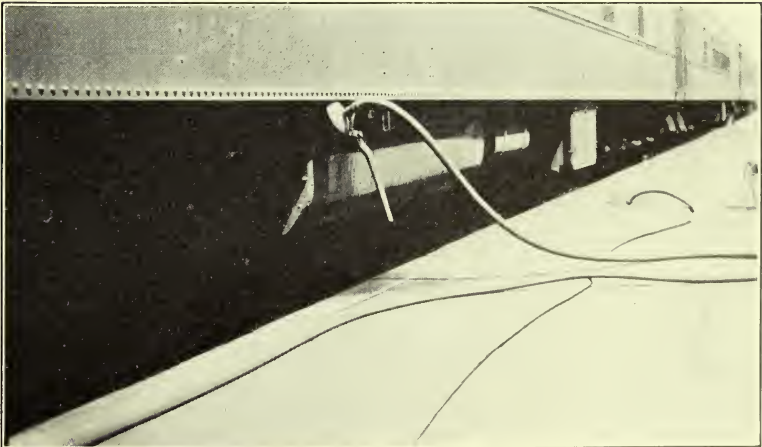
DISTRICT NO. 3—OHIO, MICHIGAN, INDIANA, WISCONSIN, ILLINOIS, MINNESOTA, IOWA, NORTH DAKOTA, SOUTH DAKOTA, AND NEBRASKA

During the year the activities of this district were carried on under the direction of Sanitary Engineer Frank R. Shaw, assisted by Associate Sanitary Engineer Elliot H. Gage.

The activities have comprised the following: (1) Inspection and supervision, for the purpose of certification, of the drinking, culinary, and ablutionary water supplies and water-supply systems and the general sanitary conditions on vessels operating in interstate traffic on the Great Lakes and the St. Lawrence River; (2) cooperation with the State health departments in the supervision of the water supplies used for drinking, culinary, and ablutionary purposes on interstate common-carrier railroads, the method of loading the water on the trains, and general sanitation of coach yards and terminals; (3) cooperation with the Office of Indian Affairs, Department of the Interior and the Department of Justice in matters related to sanitary engineering; (4) cooperation with the State health departments in matters of sanitary engineering including assistance rendered the State health



Locker used for the storage of drinking water buckets and ice containers. Note two spout filling buckets with self-closing lids; one 40-pound ice container with cover in place; sign on top of locker; and that shed can be locked



Train being watered at passenger station. Note Murdock hydrant located in concrete platform, long hose connection, nozzle protector disk, and hose reel

officer of North Dakota in organizing the bureau of sanitary engineering under a newly appointed engineer.

VESSEL WATER-SUPPLY AND SANITATION SUPERVISION

The supervision of vessel water supplies extended on June 30, 1929, to 146 vessel companies and involved 97 passenger vessels and 484 freight vessels, a total of 581 vessels. These and other statistical data are recorded later, and in connection therewith it is desired to note that the outstanding differences in the number of vessels reported as of July 1, 1928, and those in the active file on June 30, 1929, are due to the elimination of towing boats, boats with crews of 10 or less, construction boats, etc., counterbalanced to an extent by the addition of boats coming to our attention this year.

The valuable assistance rendered by the steamboat inspectors of the Department of Commerce was continued and extended this year. A personal visit was made to each of the 10 inspector's offices in this district, at which time their opinions and suggestions were solicited and a general discussion of the work entered into. The data gathered, including the concentration of freight vessels, have been most valuable to the administration by this office, and it is believed that the solicitation of suggestions from the inspectors encouraged increased personal interest in the work. All the offices gladly extended the reported data to include the expiration date of the certificate, when a certificate was found posted, which has served to reveal many vessels carrying certificates of almost ancient vintage, although new certificates have been issued to them yearly since that date. These findings have been followed up, and in the majority of cases it has been necessary to issue duplicate certificates to replace the lost certificates.

A personal visit was also made to all the city laboratories which are cooperating with this office by collecting and analyzing samples of water taken from the vessels.

The cooperation with the health department of the Dominion of Canada has been continued and a few conferences were held between the chief engineer of Canada and the district engineer.

The outstanding features of the vessel-inspection work during this fiscal year are as follows: A total of 870 visits were made to vessels. On July 1, 1928, a total of 187 vessels credited to this district had never been inspected. This was reduced to 76 through eliminations during the year of vessels not under our jurisdiction and to initial inspections. In addition to the 89 initial inspections, a total of 450 reinspections were made, of which 27 of the initial inspections and 190 of the reinspections were accomplished in slightly over three man-months. Only 9 noncompliance notices were issued, due to the policy of issuing such notices only on points specifically covered by the regulations and of allowing the vessel engineer opportunity to make corrections without reporting the matter formally to the company where a subsequent inspection could be made. A total of 422 temporary and 280 regular certificates were issued. A total of 2,296 samples of domestic water taken from vessels were analyzed by seven city health departments and two Canadian health departments. This shows an increase of 627 over the fiscal year 1928.

Although a full summary of the bacteriological results during the calendar year 1928 can not be given, as an example of the efficiency

in the purification of lake water that can be attained there is presented the results of one company operating six boats on which water is filtered and then chlorinated by mechanical means:

Vessel	Number samples taken	Per cent 10 cubic centimeters portions positive for B. coli	Vessel	Number samples taken	Per cent 10 cubic centimeters portions positive for B. coli
A-----	136	0.3	E-----	59	0
B-----	126	1.2	F-----	56	0
C-----	70	0			
D-----	63	0	Total (6)-----	510	.4

In contrast to this, the results of one boat registered as drawing water from an approved shore source were repeatedly positive in 5 to 10 cubic centimeter portions, and even in 1 cubic centimeter and 0.1 cubic centimeter portions. Condemning evidence of the loading of overboard water was observed, but the discontinuance of this practice was brought about only through the cooperation of the steamboat inspectors.

TYPHOID FEVER ABOARD VESSELS

The typhoid-fever statistics on cases reported by marine hospitals since 1915 are tabulated under Statistical Data, and show a general trend downward from 60 cases in 1915 to 11 cases in 1928. It is believed that this reduction is far greater than is apparent, for the reason that seamen have availed themselves of the marine hospitals to a greater extent in recent years than they did in former years.

A reduction during the calendar year of 1929 is anticipated, since between January 1 and June 30, 1929, there occurred but two cases, whereas during the same period in 1928 there occurred six cases.

VENEREAL DISEASE CONTROL AMONG SEAMEN

None of the companies operating on the Great Lakes have yet instituted the venereal disease program suggested by the bureau. The plan has been discussed several times by the district engineer with the president of the Lake Carriers' Association, the chairman of the welfare committee of that association, and a vice president of the Pittsburgh Steamship Co.

The records of the out-patient office of the Chicago Marine Hospital are cited below:

Venereal disease among all seamen applying for treatment at the Chicago out-patient office January 1 to December 1, 1928

New venereal disease cases-----	312
Total venereal disease treatments-----	2, 333
Total treatments, all causes-----	5, 889

Vessel statistical data—Vessels in active file July 1, 1928

Number of vessel companies-----	161
Number of passenger vessels-----	99
Number of freight vessels-----	539
Total-----	638
Number of passenger vessels not inspected prior to July 1, 1928-----	19
Number of freight vessels not inspected prior to July 1, 1928-----	168
Total-----	187

Vessels in active files June 30, 1929

Number of vessel companies.....	146
Number of passenger vessels.....	97
Number of freight vessels.....	484
Total.....	581
Number of passenger vessels not inspected prior to June 30, 1929.....	17
Number of freight vessels not inspected prior to June 30, 1929.....	59
Total.....	76
Passenger vessels drawing water from ashore.....	61
Passenger vessels purifying water aboard.....	36
Freight vessels drawing water from ashore.....	32
Freight vessels purifying water aboard.....	452
Number of vessels found using raw lake water during fiscal year July 1, 1928, to June 30, 1929.....	6
Number of eliminations due to classification, as towing, construction boats, less than 10 in crew, etc.....	70

Activity	Fiscal year 1929			Activity	Fiscal year 1929		
	Passenger	Freight	Total		Passenger	Freight	Total
Inspection:				Inspection—Continued.			
Visits to vessels.....			1 870	Canadian health department.....			25
First inspections.....	24	65	89	Chicago.....			365
Reinspections.....	153	297	450	Cleveland.....			182
Noncompliance notices.....	4	5	9	Detroit.....			2 1,213
Certificates issued:				Milwaukee.....			85
Temporary.....	57	365	422	Provincial department of health of Ontario.....			68
Regular (favorable).....	31	249	280	Sandusky.....			1
Regular (unfavorable).....	0	0	0	Toledo.....			211
Water analyses made by—							
Buffalo.....			146				

¹ Excess of visits over completed inspections is largely due to the necessity of making from 2 to 4 visits to complete an inspection at Sault Ste. Marie, Mich.

² Includes only positive analyses for July.

Typhoid fever among seamen on vessels operating in district No. 3

Navigation season	Cases	Navigation season	Cases	Navigation season	Cases
1915.....	60	1920.....	20	1925.....	7
1916.....	70	1921.....	13	1926.....	29
1917.....	49	1922.....	17	1927 ¹	10
1918.....	39	1923.....	25	1928 ²	11
1919.....	24	1924.....	21	1929.....	3 2

¹ Also 1 case of dysentery.

² Also 3 cases of dysentery.

³ Jan. 1 to June 30, 1929.

RAILROAD WATER SUPPLY

In cooperation with the State health departments the following water-supply sources and coach yards were inspected:

State	Water supply	Coach yards	State	Water supply	Coach yards
Nebraska.....	24	16	Illinois (Chicago).....	0	14
North Dakota.....	17	4	Total.....	42	37
Ohio (Toledo).....	1	0			
Minnesota.....	0	3			

An inquiry regarding coach-yard inspection carried on by the State departments revealed that during 1928 Illinois, Iowa, and Michigan inspected all the coach yards; Minnesota and Indiana a limited number; Nebraska, North Dakota, and Wisconsin none. South Dakota and Ohio did not reply.

For several years the Pullman Co. has cooperated with the service by furnishing six copies of lists of future conventions. This office would, in turn, send one copy to each district office for its guidance in urging upon the State health departments proper supervision of sanitation at those conventions where Pullman cars were to be parked. Such additional information as could be secured by telephone was also furnished the district offices. In order to minimize the work, this office effected arrangements whereby the Pullman Co. sends directly to each district office as many copies as there are States in that district, plus a file copy. On each copy a star designated those conventions, to be held the succeeding month, at which it was believed that Pullman cars would be parked.

COOPERATION WITH THE OFFICE OF INDIAN AFFAIRS

Of the 32 Indian reservations in this district as listed January 1, 1925, the Office of Indian Affairs requested sanitary engineering surveys and supervision, as time would permit, of 27. These 27 reservations are composed of 107 subdivisions, which no doubt present individual sanitary problems. During the fiscal year a representative of the service visited the following five of these reservations and surveyed those subdivisions noted. Fort Totten agency and school; Genoa school; Keshena agency and schools (agency and St. Joseph's Industrial School, Menominee Indian mills); Lac du Flambeau agency and school; Rosebud agency and schools (agency, Rosebud agency day school, hospital and agency day school at Mission, S. Dak.); Tomah school.

A very considerable amount of time was devoted to surveys, the design of plans, and the preparation of cost estimates and reports for sewerage systems for Lac du Flambeau, Tomah, and Menominee Indian mills, and for an improved and safe water system for Menominee Indian mills.

A questionnaire prepared in this district for the purpose of determining the general sanitary conditions and relative needs of the various reservations was adopted by the Office of Indian Affairs for general use. The replies to these questionnaires have served admirably to indicate the relative importance of the visits of inspection.

In May this office requested all reservations to submit samples of the domestic water bimonthly throughout the summer to the State laboratories (which readily agreed to cooperate), so as to secure a bacteriological index to the sanitary quality of the water over a period of time. The reports of analyses thus far received reveal that certain of the supplies are periodically or continuously contaminated with *Bacillus coli*. As a result of this procedure in this district, the Office of Indian Affairs has directed the superintendents of all reservations in the country to have bacteriological analyses made at least twice yearly.

COOPERATION WITH THE DEPARTMENT OF JUSTICE

In accordance with the cooperative agreement with the Superintendent of Prisons a survey of the Boys' Industrial School at Chillicothe, Ohio, was made and a report prepared.

COOPERATION WITH STATE HEALTH DEPARTMENTS

During part of August and part of September of this fiscal year, a representative of this office assisted the health officer of North Dakota with the organization of a bureau of sanitary engineering under the direction of A. L. Bavone, then newly appointed.

MISCELLANEOUS

From September 17 to October 30, the district engineer served as the engineering member of a unit assigned to the American Red Cross for relief duty in Porto Rico following the devastating hurricane of September. A special report was made covering this detail.

DISTRICT NO. 4.—ALABAMA, MISSISSIPPI, MISSOURI, LOUISIANA, OKLAHOMA, ARKANSAS, KANSAS, KENTUCKY, TEXAS, AND TENNESSEE

The activities of the district were carried on under the direction of Sanitary Engineer H. N. Old, assisted by Associate Sanitary Engineer E. C. Sullivan.

The activities during the fiscal year 1929 were those concerned with vessel and railroad water-supply supervision, shellfish sanitation, cooperation with State health departments and Federal bureaus, and those of miscellaneous nature.

VESSEL WATER-SUPPLY SUPERVISION

Within the district there are about 60 sources of water supplies listed for certification by vessels operating in interstate traffic. Surveys of these sources are being made by the respective State departments of health with the aid of the Public Health Service from time to time as the State departments may request it. During the calendar year 1928 action was taken on 88 per cent of these supplies.

A complete check was made, by use of all available sources of reference, of the vessel companies and vessels operating in and coming within the jurisdiction of this district. It was found that 115 vessel companies are included in this category with a total of 274 vessels, of which there are 84 passenger and 190 freight.

Authorization for the employment of a sanitary inspector under temporary appointment having been secured in February, an inspector was placed on duty March 5, 1929, and assigned to Houston, Tex., as field headquarters. The services of this inspector were very satisfactory, and due to this assistance it was possible to make inspection of the drinking-water systems of practically all vessels operating in interstate traffic and coming into the Texas ports, such as at Houston, Galveston, Beaumont, Port Arthur, Texas City, and other smaller ports of that State. It was found that of the 90 vessels examined by this inspector, approximately 70 per cent were vessels coming within the jurisdiction of interstate sanitary district No. 1, while approximately 25 per cent belonged to this district, and the remainder were charged to interstate sanitary districts Nos. 2 and 5.

Cooperative arrangements were made with the other districts concerned relative to forwarding of reports and action to be taken concerning deficiencies found.

The most commonly encountered defects in vessel water-supply sanitation concerned the filling connections, overboard water taps not properly indicated as unsafe for drinking and culinary purposes, cross connections between potable water-supply and overboard water, and separation of ice and water in water coolers used on vessels.

Due to the fact that most of the vessel inspection has been accomplished during the later months of the year, and also because of the reinspections of district No. 1 vessels being made by that station, it is difficult to state definitely the number of compliances secured; but from present indications, it will probably be possible to issue favorable certificates for many district No. 4 vessels as soon as reinspections can be made.

During the early part of June much attention was devoted to emergency work at Houston, Tex., as the State department of health had requested the assistance of this station in connection with the condition of the municipal water system at that city following a flood which inundated the entire central city plant and indirectly caused pollution of the entire system.

By the cooperation of the health departments of Cincinnati, Ohio, St. Louis, Mo., and Louisville, Ky., there have been submitted to this office 956 laboratory reports of water samples from vessels operating in interstate traffic. This cooperation has been very valuable. Upon evidence of consistent contamination of a vessel supply the operating company has been advised and instructions issued to properly sterilize the drinking-water system on board. These instructions have had a very potent effect not only from the standpoint of the vessel concerned but in its inference to the health department submitting the report that the Federal service was supporting them in the routine collection of samples.

The cooperation of the Steamboat Inspection Service was continued through the year and was very valuable in checking the lists of vessels coming within the jurisdiction of this station.

While 21 cases of typhoid fever were reported to this station for the year as occurring among seamen on vessels entering ports of this district, 9 of these cases were on one vessel. This was the Danish steamer *Frederichsborg*, and from all epidemiological evidence, the infection was contracted by infected food on board or at a South American port.

Upon receipt of advice concerning a typhoid case the vessel company involved was communicated with and instructions were issued covering the thorough disinfection of the drinking-water system on board the vessel concerned. With the exception of the foreign vessel to which reference has been made, no two cases were reported from the same vessel.

RAILROAD WATER-SUPPLY SUPERVISION

Within the district there have been listed approximately 700 water supplies by interstate railroad lines seeking the approval of these supplies for drinking and culinary purposes. The respective State health departments are engaged in conducting surveys of these sources with the assistance frequently of the personnel of this station.

During the calendar year action was taken on 85 per cent of these supplies.

A great deal of attention was given to railroad and terminal coach-yard sanitation during the year, and much better results were secured than had been anticipated. A very distinct attitude of cooperation was encountered in dealing with the railroad officials; and while it is somewhat difficult to place the results on a percentage basis, it is felt that at least 80 per cent of the recommendations made by this office were adopted and that a much higher standard of sanitation exists in the coach yards and terminals visited than has prevailed in the past. In conferences with railroad officials there is manifest a very encouraging appreciation of the importance of railroad sanitation.

The coach yards and terminals included in the 183 sanitary surveys are located in the following cities:

Birmingham, Mobile, and Montgomery, Ala.; Hot Springs and Little Rock, Ark.; Louisville, Ky.; New Orleans, La.; Jackson and Vicksburg, Miss.; St. Louis, Mo.; Oklahoma City, Okla.; Chattanooga, Knoxville, Memphis, and Nashville, Tenn.; Brownsville, Corpus Christi, Dallas, Fort Worth, Galveston, Houston, San Antonio, and Waco, Tex.

The larger railroads concerned in these surveys are as follows:

Atchison, Topeka & Santa Fe Railway, Atlanta, Birmingham & Coast Railway, Baltimore & Ohio Railroad, Central of Georgia, Chesapeake & Ohio Railway, Chicago & Alton Railroad, Chicago, Rock Island & Pacific Railway, Cleveland, Cincinnati, Chicago & St. Louis Railway, Fort Smith & Western Railway, Fort Worth & Denver City Railway, Gulf, Colorado & Santa Fe Railway, Gulf, Mobile & Northern Railroad, Illinois Central Railroad, Louisville & Nashville Railroad, Missouri, Kansas & Texas Railroad, Missouri Pacific Railroad, Mobile & Ohio Railroad, Nashville, Chattanooga & St. Louis Railway, New Orleans Great Northern Railroad, Pennsylvania Railroad, St. Louis, San Francisco Railway, St. Louis, Southwestern Railway, Southern Pacific Lines, Tennessee Central Railway, Texas & Pacific Railway, Wabash Railway.

By a cooperative agreement between the Pullman Co. and the Public Health Service this office has been furnished a monthly list of all special gatherings or conventions and special note made of those where it is anticipated that sleeping cars will be parked for occupancy. These lists are forwarded to the health officers of the 10 States comprising this district, with the suggestion that this office is ready to assist in sanitary supervision of Pullman parking areas upon the request of the State or local authorities.

During the Mardi Gras at New Orleans in February, about 50 sleeping cars were parked as living quarters for a period of five days, and this office cared for the sanitary supervision of the two areas used for this purpose. Visits have been made to several other cities in connection with other district activities in anticipation of Pullman car parking problems.

SHELLFISH SANITATION SUPERVISION

Of the four shellfish producing States in this district, it may be said that Louisiana and Mississippi are the most important from the standpoint of interstate shipments. Hardly 5 per cent of the

Texas production leaves the State, while the production in Alabama is largely consumed within that State.

As all shellfish-producing areas in these Gulf States had been rather well surveyed and laboratory examinations made from 1925 to 1928, there was little activity along this line during the present fiscal year. Conditions as to potential pollution of the areas change very little in this section, so that with the areas previously banned still under restriction it was not believed that any very questionable areas remained open. A check of several areas in these States has been arranged for the coming season.

Texas submitted 12 shellfish certificates for approval during the past season. Each of the other three States maintained in force during the season about 23 certificates. According to monthly reports of inspections of shellfish establishments submitted by the States, a total of 561 inspections were made, as follows: Alabama 252, Louisiana 78, Mississippi 181, and Texas 50. This shows average number of inspections per establishment as follows: Alabama 11, Louisiana 3.3, Mississippi 8, and Texas 4.2.

Personnel of this station conducted 164 inspections of shellfish plants in these States in order to determine the effectiveness of State-control measures. These measures were found to be very ineffective in Texas and not as stringent in Louisiana and Mississippi as could be desired.

COOPERATION WITH STATES

During the fiscal year very considerable cooperation was extended to some of the State health departments in this district through assistance in conducting surveys of water supplies used on interstate carriers, examination of shellfish establishments, and participation in conferences and State scientific meetings.

At the request of the Mississippi State sanitary engineer surveys were made of six water supplies in November and December.

At the request of the State sanitary engineer of Arkansas surveys were made of 11 water supplies in that State in June.

Texas requested surveys of four of their largest municipal water supplies, at Dallas, Fort Worth, Galveston, and Houston. These surveys, of detail nature, were made during the first half of the fiscal year and a very comprehensive report was submitted on each one before the end of the calendar year. Additional surveys were made for this State at Brownsville and Corpus Christi.

COOPERATION WITH OTHER FEDERAL ORGANIZATIONS

Not as much activity was devoted to this feature as was desired by this office during the fiscal year, particularly with respect to the Indian reservation surveys in Oklahoma.

A survey was made of the water supply at the Wheelock Academy, a Choctaw school, at Millerton, Okla., and a report with detailed recommendations submitted.

One visit was also made to the Haskell Institute, operated by the Indian Bureau, at Lawrence, Kans. This visit was for the purpose of going over the matter of a sewage-treatment plant to be installed and to consult with the State sanitary engineer, who had been appointed by the Indian Bureau in 1927 to prepare recommendations and specifications for an adequate treatment plant.

At the request of the Department of Justice a detailed sanitary survey was made in February of the United States penitentiary at Leavenworth, Kans. A report and specific recommendations were made covering the findings of this survey.

At the request of the Mississippi-Warrior Service, a Federal barge line operating on the Mississippi River and tributaries, advice was furnished on the subject of distillation apparatus for the treatment of drinking water on the barges operated by that organization.

A conference was held at Memphis with officials of the Inland Waterways Corporation from Minneapolis relative to necessary corrections in the drinking and culinary water system on board the steamship *Webber*, one of the vessels operated by that organization on the upper Mississippi River, and upon which four cases of typhoid, reported to interstate sanitary district No. 3, occurred simultaneously last August.

MISCELLANEOUS

Four technical meetings were attended by station personnel during the year and five papers prepared and presented at these meetings.

TABULAR SUMMARY

<i>Summary of vessel water-supply supervision</i>		Major conferences:	
Inspections:		With railroad officials-----	45
First inspections—		With other (principally health authorities)-----	31
Passenger-----	4	<i>Summary of shellfish sanitation supervision</i>	
Freight-----	80	State certificates approved-----	84
Reinspections—		State certificates, approval withdrawn-----	1
Passenger-----	11	State certificates canceled-----	9
Freight-----	17	Areas investigated-----	2
Certificates issued:		Shellfish plants inspected-----	164
Temporary, favorable—		Conferences (principally State officials)-----	27
Passenger-----	90	<i>Miscellaneous summary</i>	
Freight-----	146	Cooperation, Federal departments:	
Major conferences:		Bureau of Indian Affairs—	
With shipping officials-----	33	Surveys-----	2
With others-----	7	Conferences-----	2
Water analyses made-----	956	Other Federal organizations—	
Typhoid fever cases reported,		Surveys-----	2
United States marine hospitals--	21	Conferences-----	3
<i>Summary of railroad water-supply supervision</i>			
Inspections:			
Sources of water supply-----	28		
Coach yards-----	121		
Terminals-----	62		

DISTRICT NO. 5.—ARIZONA, CALIFORNIA, COLORADO, NEW MEXICO, NEVADA AND UTAH

DISTRICT NO. 6.—IDAHO, MONTANA, OREGON, WASHINGTON, AND WYOMING

The engineering personnel detailed to these two districts during the fiscal year were as follows: Sanitary Engineer H. B. Hommon, in charge; Associate Sanitary Engineer A. L. Dopmeyer; Junior Assistant Sanitary Engineer H. D. Cashmore, July 1 to October 14, 1928;

Junior Assistant Sanitary Engineer O. C. Hopkins, December 17 to June 30.

The work carried out during the year was divided, as in previous years, as follows: (1) Examination of water supply systems on vessels engaged in interstate traffic; (2) cooperation with State and city departments of health in the two districts in the examinations of water supplies on trains engaged in interstate traffic and in the investigation of special problems of sanitation; (3) cooperation with the National Park Service in the supervision over sanitation in national parks and monuments; (4) cooperation with the Indian Service on problems of watershed sanitation; and (6) miscellaneous activities.

VESSEL WATER-SUPPLY AND SANITATION SUPERVISION

The inspection of vessel water-supply systems was carried on by two service engineers working about one-fifth of their time and by an assistant sanitary inspector working four months. There are 450 vessels engaged in interstate traffic on the West Coast and of this number 321 were inspected and 147 regular certificates issued and 201 temporary certificates. The figures for inspections and certificates issued represent approximately 100 per cent increase over the work done last year. This was due to the assignment of an additional engineer to the two districts and to the employment of a sanitary inspector for a longer period than in other years. There were only two cases of typhoid fever reported by the marine hospitals for vessels engaged in interstate traffic. In 1927 and 1926 the number of cases were, respectively, 10 and 8.

Summary of vessel water-supply supervision

Activity	Passenger	Freight	Total
Inspection:			
First inspection	17	34	51
Reinspections	154	116	270
Certificates issued:			
Temporary	76	125	201
Regular (favorable)	85	62	147
Regular (unfavorable)	0	0	0
Conferences			36
Typhoid fever cases			2

RAILROAD WATER-SUPPLY AND SANITATION SUPERVISION

Conferences were held during the year with the State health officers and State sanitary engineers of the nine States of the two districts having State sanitary engineers, and visits were made to the two other States which do not have engineers. In the conferences with the State health officers and sanitary engineers, procedures for making out certificates for water supplies were considered and various problems connected with the examination of water supplies were discussed. In Nevada and Wyoming, the two States which do not have engineers, considerable time was spent in making surveys of water supplies, and in other States assistance was given in making surveys where it was evident the personnel of the State department was not adequate to carry on the work. The record of surveys made is as follows: California, 44; Arizona, 7; Wyoming, 16; Montana, 4; Washington, 12; Nevada, 3; Oregon, 6; and Colorado, 1.

In addition to the assistance rendered States in connection with the certification of water supplies used by railroads, a service engineer was detailed to make a complete survey of cross connections on the Denver City water supply and to assist the sanitary engineer of Montana in handling problems of sanitation that developed during a flood at the town of Wibaux.

COOPERATION WITH CITY HEALTH DEPARTMENTS

By request of the city health officer of the city of San Francisco an extensive investigation was made of a dust nuisance from an asphalt aggregate plant. In addition to this work, conferences were held with the city health officers of Seattle, Wash., and Portland, Oreg., regarding special problems of sanitation.

SANITATION IN NATIONAL PARKS AND MONUMENTS

The assistance rendered the National Park Service in maintaining proper sanitary conditions in the national parks was in a general way similar to that given in previous years. The number of tourists visiting the parks increases with each succeeding year and the problems of sanitation become more and more difficult with the increase in the number of people. The outstanding example of the large increases that occur in one year was at Carlsbad National Monument, where the number of tourists increased over 100 per cent. All of the other parks showed increases varying from a small amount up to 25 per cent.

The more important activities carried out in the various parks and monuments during the year were as follows:

Bryce Canyon National Park.—This park was created during the year. It had been previously operated by the State of Utah, the Union Pacific Railroad Co., and the United States Forest Service. An inspection of the park was made and recommendations were given for improving the water supply and for extending the sewerage system and enlarging the disposal plant.

Carlsbad National Monument.—The large increase in travel to this monument has increased the problem of feeding the tourists in the cavern and disposing of sewage. During the year plans were prepared for a sewerage system and disposal plant at the entrance to the cavern, recommendations given for improving the water supply, and suggestions made for disposing of the sewage in the cavern and for changing the lunch room to a new location in the cavern. The ultimate disposal of sewage from the comfort stations in the cavern has not been settled, but it is believed that some method of removing the sewage, either by a pump or by an elevator, will have to be adopted within the next few years.

Casa Grande National Monument.—A visit was made to this monument during the year, and plans and estimates were prepared for a sewerage system and disposal plant and recommendations given for improving the water supply.

Chaco Canyon National Monument.—This monument was not visited during the year, but from maps and records available a report with plans and estimates was submitted for water-supply and sewerage systems and for a sewage-disposal plant.

Crater Lake National Park.—Complete plans, estimates of cost, and bills of material were submitted for a sewerage system and disposal plant for Government headquarters, and preliminary plans, estimates, and justifications were prepared for a sewerage system and disposal plant for the automobile camp at the rim area of the lake. General inspections were made of the hotel in the park and the automobile camping grounds.

General Grant National Park.—Plans were prepared and estimates of cost were made, together with a bill of materials, for an incinerator for this park. In addition, general inspections were made of the lodge, automobile camp grounds, and other places handling food products.

Glacier National Park.—General inspections were made of all the hotels, chalets, camp grounds and other places in the park handling food products and recommendations were given for improving the sewage-disposal plant at Many Glacier Hotel, Two Medicine Chalet, Going-to-the-Sun Chalet, and St. Mary's Camp.

Grand Canyon National Park—South Rim.—Two inspection trips were made to the South Rim during the year at the request of the superintendent of the park, to inspect the operation of the sewage-disposal plant and investigate other problems of sanitation. In addition to the work on the South Rim two trips were made to Phantom Ranch, located on the Colorado River, for the purpose of considering the question of sewage disposal at this place.

The sewage-disposal plant at the South Rim, designed by Public Health Service engineers attached to this station and operated under general supervision of the service, continued to produce an effluent that complies with the Treasury standard for drinking water. During June of this year the amount reclaimed was 120,000 gallons per day, and this water is worth to the operators and the Government approximately \$300 per day. The fresh water hauled to the canyon costs \$3.10 per 1,000 gallons, and if the sewage were not reclaimed, it would be necessary to haul an additional 120,000 gallons during the peak of the tourist season.

The garbage incinerator, which was likewise designed by service engineers at this station, was operated throughout the year and burned all of the garbage at a much less cost than the former method of disposing of garbage by hauling it away on cars. The can-crushing machine installed at the time the incinerator was built was used to bale the waste tin cans and the bales were shipped out of the park by the Santa Fe Railroad Co. to their reclaiming plant near Chicago.

North Rim.—Two trips were made to the North Rim to make general inspections of the hotel and camp grounds and the operation of the sewage-disposal plant. Data were also supplied the Union Pacific Railroad for the design of an incinerator.

Lassen Volcanic National Park.—Preliminary plans and estimates were submitted to the superintendent for a new water-supply and sewerage system and disposal plant for Government headquarters.

Mesa Verde National Park.—Inspections were made of the lodge and camps and preliminary plans and estimates submitted for a new sewerage system and disposal plant and suggestions made for moving the automobile camp and present operators to a new location in the park. Recommendations were also given for improving the present

water-supply system and for obtaining an additional source of supply.

Montezuma Castle National Monument.—From maps and reports submitted by the superintendent of this monument, plans and estimates were submitted for a new water-supply system and sewerage system and disposal plant.

Mount McKinley National Park.—Plans, specifications, bills of material, and estimates were submitted for a pumping plant, water-storage tank, and distribution system.

Mount Ranier National Park.—General inspections were made of the hotels, camp grounds, and other places handling food at Longmire and Paradise Valley, and a special report was prepared on the operation of the sewage-disposal plant at Paradise Valley. Preliminary plans, estimates, and justifications were prepared for a sewerage system and disposal plant for Longmire and a general report was submitted for sanitary improvements that will be necessary in the Yakima Park section of the park when this section is developed.

Petrified Forest National Monument.—Inspections were made at this monument and recommendations given for a new water-supply system for the custodian's headquarters.

Pinnacles National Monument.—Two visits were made to this monument during the year and recommendations given to the custodian for a sewerage system and disposal plant.

Platt National Park.—Plans and recommendations were submitted for protecting the mineral springs against contamination and for handling the water from the springs.

Rocky Mountain National Park.—General inspections were made of hotels and camps in the park; recommendations given for the development of a sewerage system, disposal plant, and water-supply system for Glacier Basin camp grounds; a report was prepared on the pollution of the Big Thompson River by the streams entering this river from the park; recommendations for improvements of sewerage and water systems and disposal plants for Aspenglen and Endovalley camp grounds were given; recommendations were made for comfort station and sewage disposal at Fall River Pass; and a special report was submitted on operation of sewage-disposal plant and water-supply system at Government headquarters.

Sequoia National Park.—Complete plans, specifications and bills of material were prepared for sewerage system and disposal plant and garbage incinerator for Government headquarters. In addition general inspections were made of the lodge and camps at Giant Forest and at Hospital Rock.

Tumacacori National Monument.—Preliminary plans and estimates were prepared for sewerage and water-supply systems and sewage-disposal plant for this monument.

Yellowstone National Park.—The work done in Yellowstone during the year included general inspections of all the hotels, camp grounds, and other places handling food; design of sewage system and disposal plant for Fishing Bridge Junction; recommendations for improvement in the operation of the sewage-disposal plants at the eastern entrance, Upper Basin, Thumb, and the Canyon; checking preliminary plans and estimates for a sewerage system and disposal plant for Mammoth Hot Springs, and plans for improving the water supply

at this place; and recommendations for mosquito-control work throughout the park.

Yosemite National Park.—The more important work done in Yosemite during the year was (1) the design of a water-storage tank; (2) preparation of preliminary plans, estimates, and justification for sewage-disposal plant and extension of the sewer system on the floor of the valley; (3) conferences with the engineer of the park on the operation of the garbage incinerator and the construction of a water-supply system for Glacier Point. The original plans and estimates for this water-supply system were prepared in the offices of this district; (4) general inspections of all hotels, camps, and lodges and special report on water-supply system for developments at Tuolumne Meadows; (5) conference with park service officials, city officials of San Francisco, regarding problems of sanitation on the Tuolumne River watershed, which lies in the park and will in the near future be the source of the drinking water for the city of San Francisco.

Zion National Park.—The lodge and camps at this park were inspected and recommendations given for improvements to the sewage-disposal plant.

COOPERATION WITH THE OFFICE OF INDIAN AFFAIRS

The more important work done during the year in connection with sanitation on the Indian reservations was as follows.

Chemawa Indian School.—Complete plans and specifications and bills of material were submitted to the superintendent for an extension of the sewerage system and a new sewage-disposal plant, and the construction work was carried on under the general supervision of engineers of this station.

Tongue River Indian Agency.—Considerable time was spent during the year in getting out plans and estimates for a new water-supply and sewerage system and disposal plant for this agency. On account of the difficulties encountered in obtaining data on the available water supplies, particularly deep wells, and information pertaining to freight rates and cost of materials, it was impossible to get out estimates within the time ordinarily allotted to investigations of this kind.

Phoenix Indian School.—A complete report was submitted to the superintendent of the school showing the excessive cost of using the hard water from the present supply at the school, and recommendations were given for a new supply.

Salt River and Lehi Subagencies.—General inspections were made at these subagencies and recommendations given for improving the sewerage systems and disposal plants.

Fort Yuma Indian Agency.—Inspections were made at this agency and a general report was submitted on the water-supply system and sewage-disposal plant.

Yakima Indian Agency.—An inspection was made and a report submitted giving recommendations for the disposal of sewage.

At the following agencies and schools inspections were made and reports submitted on water supplies and sewage disposal: Pima Indian Agency, Leup Indian Agency and School, Sells Indian Agency, Truxton Canyon Agency, Colorado Indian Agency, Fort Apache Indian Agency, Shoshone Indian Agency, Crow Indian Agency, Paiute Indian Agency, and Klamath Indian Agency.

COOPERATION WITH UNITED STATES FOREST SERVICE

No field work was done in cooperation with the Forest Service, but many different problems of watershed sanitation were handled by correspondence with supervisors of various national forests.

SHELLFISH SANITATION

The work done in connection with shellfish sanitation was carried on by correspondence. The only oyster-growing areas of any importance on the west coast are in the State of Washington, and the State sanitary engineer submitted reports of inspections of shellfish plants and growing areas and took up special problems through correspondence.

MISCELLANEOUS ACTIVITIES

The miscellaneous activities included: (1) Preparation of an article on The Design and Operation of Sewage Disposal Plant at Grand Canyon, Ariz.; (2) preparation of a paper on the subject Certification of Water Supplies Used on Common Carriers in Interstate Traffic; (3) preparation of a paper on The Industrial Waste Problem in California; (4) investigation of leakage in tanks formed in part by the hull of ships; (5) attendance of service engineers at annual meeting of the New Mexico Public Health Association, Arizona Public Health Association, and fall meeting of the California Sewage Works Operators Association; (6) preparation of sanitary regulations to be included in all contracts for construction of highways in the national parks; (7) assistance by service engineers in the organization of the Sewage Works Operators Association of California; (8) investigation of outbreak of typhoid fever at McNary, Ariz.; (9) as chairman of a committee of the National Park Service on medical and hospital practices, the service engineer collected data from all the national parks on hospital space available, number of doctors and nurses employed, and fees charged to Government employees and other employees in the park and tourists visiting the parks.

RURAL HEALTH WORK

Cooperative demonstration projects in rural sanitation were carried on during the fiscal year ended June 30, 1929, in 204 counties or districts in 17 States as follows:

Alabama.....	8	Mississippi.....	12
Arkansas.....	24	Missouri.....	13
California.....	3	Montana.....	4
Georgia.....	4	New Mexico.....	7
Idaho.....	1	North Carolina.....	3
Illinois.....	1	Oklahoma.....	4
Kansas.....	7	South Dakota.....	1
Kentucky.....	32	Tennessee.....	21
Louisiana.....	25	Texas.....	1
Massachusetts.....	.1	Virginia.....	16
Michigan.....	2	West Virginia.....	14

The details relating to the work carried on in the 204 projects are made the subject of a special report.

The appropriation for the rural sanitation work of the Public Health Service for the fiscal year 1929 was \$347,000. Against this amount appropriated was set up a budget saving of \$1,900. The

unexpended balance from the operations of the preceding fiscal year was \$2,500. Thus \$347,600 was available for expenditure during the fiscal year 1929. Of this amount a total of \$333,839.96 was expended through specific allotments toward the support of 204 field projects and \$6,025.88 was used for special studies and administration.

According to data collected by the rural sanitation office from the State health departments, the number of counties or equivalent divisions provided with local health service reaching all rural sections thereof, under the direction of whole-time county or district health officers, was 467 at the beginning of the calendar year 1929, as compared with 414, 337, 307, 280, 250, 230, 202, 191, and 109 at the beginning of the calendar years 1928, 1927, 1926, 1925, 1924, 1923, 1922, 1921, and 1920, respectively. The gain of 358 within this 9-year period is significant.

The prospects are good for a better rate of progress in this vitally important field in the next few years. Public-health administrators generally now appear convinced that local official health service under the direction of a whole-time local health officer is the most essential element in the development of an adequate system of effective and economical public-health service in the United States, and that most of the work of the Federal and State health agencies should be conducted with and through such local health departments. State health departments in increasing number from year to year are obtaining authorization and appropriations to enable them more nearly to do their proportionate part in the development and maintenance of whole-time county health service. The cooperative demonstration work of the Public Health Service in rural sanitation evidently has been a very important factor in the development of efficient economical whole-time rural (county) health service in the United States. It would appear right and proper for this activity of the service now to be placed technically on a cooperative instead of a demonstration basis and be conducted on a largely increased scale.

CONFERENCE OF THE SURGEON GENERAL WITH THE STATE AND TERRITORIAL HEALTH OFFICERS

In accordance with provisions in the act of July 1, 1902, the annual Conference of the Public Health Service with the State and Territorial Health Officers was held in Washington, D. C., on June 3 and 4, 1929. The sessions were attended by delegates from 34 States, 1 Territory, and the District of Columbia, and visitors from the Pan American Sanitary Bureau and the provincial health departments of Canada. A 2-day program was carried out, in which the following subjects were discussed:

1. A proposed plan for the establishment of a morbidity registration area.

2. A. Post-vaccinal encephalitis. B. The action of the vaccination dressing in the development of post-vaccinal tetanus.

3. The present status of the milk studies of the Public Health Service.

4. Dentistry and its relation to public health.

5. Current studies of undulant fever.

6. Studies of negro health problem in Tennessee,

7. Current malaria studies with special reference to control measures.
8. Information presented by State health officials on the transmission of disease by dead bodies.
9. Meningococcic meningitis and measures for its control.
10. Points to be considered in case of a poliomyelitis epidemic.
11. Shellfish sanitation.
12. Current studies of typhus fever.
13. Cancer.

DIVISION OF FOREIGN AND INSULAR QUARANTINE AND IMMIGRATION

In charge of Asst. Surg. Gen. F. A. CARMELIA

QUARANTINE TRANSACTIONS

During the fiscal year 1929 officers of the Public Health Service engaged in the administration of the United States quarantine laws inspected 27,867 vessels and 3,320,959 persons. Of these, 19,529 vessels, 823,668 passengers, and 1,134,906 members of crews were inspected at the continental maritime stations. At insular stations 2,937 vessels, 138,947 passengers, and 203,182 members of crews were inspected. At foreign stations 5,401 vessels, 544,127 passengers, and 366,762 members of crews destined for ports of the United States were inspected. There were 3,791 vessels fumigated or disinfected at continental stations, 707 at insular stations, and 990 at foreign stations. At the border quarantine stations there were 109,367 travelers inspected, exclusive of the local interurban traffic, numbering 6,878,450 who were under surveillance.

GENERAL PREVALENCE OF QUARANTINABLE DISEASES

Plague.—Plague was reported from almost all parts of the world, India, Argentina, and the Dutch East Indies still being the world centers of plague prevalence. The usual incidence of this disease continued to be reported from Nigeria, Siam, Indo-China, Madagascar, and other endemic centers, and during the summer and early fall of 1928 plague was reported as being epidemic in Tungliao, Mongolia, and in Morocco. This disease continues to prevail in certain countries in South America, particularly in Rosario, Buenos Aires, and Rio de la Plata ports in Argentina, and has recently been reported in Montevideo, Uruguay; and plague rats have been found as far north as Santos, Brazil. Plague, by reason of its wide geographical distribution and the method of its spread, remains one of the major pandemic diseases which requires the constant vigilance of health authorities in all countries. No cases of this disease, however, occurred on board vessels arriving at United States quarantine stations during the year.

Cholera.—Cholera was reported from many parts of Asia. It is prevalent in Ceylon, China, Indo-China, India, and Siam. During the spring of 1929 several thousand cases were reported each week from India. The examination of potential carriers and the prohibition of the embarkation of those actually discovered at ports of embarkation effectually prevented the introduction of the infection into the Hawaiian Islands and the United States.

Yellow fever.—The yellow-fever situation along the east coast of South America has become more threatening during the past year. This disease is now being reported from Rio de Janeiro, Bahia, Pernambuco, and as far north as Para, at the mouth of the Amazon

River. Information received during the latter part of the fiscal year indicated that the disease had spread to Magdalena River ports in Colombia, Socorro, in the interior, being most affected. The nearer the infection spreads toward the Caribbean, the more threatening the situation becomes in so far as concerns the protecting of the ports of the United States, particularly those along the Gulf coast, against the introduction of such infection. Cases of yellow fever also appear in certain sections of Africa every year, although great strides have been made in the control of this disease by the application of scientific measures made possible by the discovery of the methods by which the disease is spread. However, recent information received indicates that this disease is increasing somewhat in certain sections of Liberia, particularly Monrovia.

Typhus fever has been declining since the close of the World War, but it is still reported from many countries in Asia, Africa, and Eastern Europe. For the prevention of the introduction of this disease, 92,603 of the passengers who embarked at European ports for United States ports were deloused under the supervision of medical officers of this service and their clothing and baggage, amounting to 95,816 pieces, were disinfected. Occasional cases of this disease was reported also during the year from Mexico and the west coast of South America.

Smallpox.—Smallpox has been prevalent in England for a number of years, but during the first half of the year 1929 the number of cases reported was less than during the corresponding period of the year 1928. However, in April a vessel arrived at Glasgow from Bombay with 38 cases of smallpox on board, following which France imposed quarantine restrictions against persons coming from Great Britain. During the year there occurred a severe epidemic of smallpox in Hong Kong, which spread along the China coast. The disease is prevalent in ports of South America and in many ports which have direct and frequent communication with the United States. Three cases of smallpox reached our quarantine stations during the year; these were isolated and the vessels and their personnel were given the necessary treatment.

CHANGES IN QUARANTINE PROCEDURE

Early in the fiscal year 1929 the quarantine service for Columbia River ports underwent a plan of reorganization. Statistics of the Public Health Service show that about 80 per cent of all vessels from foreign ports entering the Columbia River are destined for Portland, Oreg., 3 per cent are destined for Astoria, while the balance, 17 per cent, are destined for various intermediate ports on the Columbia River. Prior to that date no provision was made at Portland for the observation of quarantine requirements for vessels destined for that port, and vessels arriving after sunset were obliged to await over night for quarantine inspection at sunrise the next morning at Astoria before proceeding up the river to their port of destination. The new plan permits vessels entering the river in the early evening to steam all night up the river instead of having to await over night at Astoria for inspection the following morning, thus conserving a great deal of time. These new facilities at Portland are additional to those existing heretofore, and all vessels bound for the port of Astoria or for intermediate ports below Portland and all vessels with sickness on board

at time of arrival will stop at Astoria for quarantine treatment. These changes in quarantine procedure have resulted in greatly improved quarantine service for the Columbia River ports and considerably facilitates the movement of shipping.

Several new international bridges were constructed across the Rio Grande along the Mexican border, resulting in increased quarantine and immigration activities at these points. On this account it became necessary to open a new quarantine station at Thayer, Tex., on September 1, 1928, and one at Zapata, Tex., on April 1, 1929.

During the past year the Public Health Service made arrangements for the performance of necessary quarantine and immigration inspections in connection with the establishment of airports of entry in a number of ports. These arrangements were made at Buffalo and Albany, N. Y.; Seattle, Wash.; Los Angeles and San Diego, Calif.; Brownsville, Tex.; Miami and West Palm Beach, Fla.; San Juan, P. R.; and Nogales, Ariz. Similar arrangements were completed during the preceding fiscal year at Key West, Fla., where Meacham Field, on the Island of Key West, was officially designated an airport of entry on December 20, 1927. Information was also received of the designation of airports of entry at St. Paul, Minn., and Newark, N. J., but there being no medical officer of the Public Health Service stationed in or near these ports, and funds for the employment of additional medical personnel not being available, it was impracticable to make suitable arrangements for the required quarantine and medical immigration examinations incident to the arrival of aircraft at these ports from foreign ports.

In an opinion rendered under date of October 5, 1928, the Solicitor of the Treasury Department ruled that aircraft arriving at officially designated airports of entry in the United States or its possessions from foreign ports are not properly chargeable for quarantine services rendered at the rates prescribed by the Secretary of the Treasury for maritime vessels, set forth in Treasury Department Circular No. 398, Rates to be Charged Vessels at National Quarantine Stations, Exclusive of New York, and accordingly charges are not made for quarantine services rendered aircraft.

At the close of the fiscal year negotiations for a reciprocal quarantine arrangement between the Government of the United States and the Dominion of Canada were being perfected, through the State Department, whereby vessels from foreign ports entering the international waters of Puget Sound on the Pacific coast or the Great Lakes via the St. Lawrence River on the Atlantic coast that call at ports of both countries would be subjected to but one quarantine inspection. The plan contemplated is that a pratique granted by a quarantine officer of either country for primary entrance into a port of that country will be subsequently accepted during that voyage by the authorities of the other country in so far as these international waters are concerned. This agreement is in accord with the provisions of articles 56 and 57 of the International Sanitary Convention of Paris, 1926, and such an arrangement would greatly facilitate the movement of shipping.

The Public Health Service continued its cooperation with the Bureau of Animal Industry in the enforcement of Bureau of Animal Industry Order No. 281 for the prevention of the importation of animals from districts designated infected with foot-and-mouth

disease and rinderpest. In addition, in compliance with a request from the Department of Agriculture, quarantine officers were directed to instruct captains of vessels with respect to the provisions of Bureau of Animal Industry Order No. 315 concerning the disposal of garbage derived from certain foodstuffs originating in regions in which rinderpest or foot-and-mouth disease exists.

AMENDMENTS TO THE QUARANTINE REGULATIONS

Three amendments to the United States Quarantine Regulations were promulgated during the year:

Amendment No. 11, issued December 22, 1928, amended paragraph 2 of the Quarantine Regulations to exempt aircraft from foreign ports or ports in the possessions or dependencies of the United States from the necessity of obtaining bills of health except during the prevalence of quarantinable disease in such ports of departure or call. This amendment, however, does not modify the application of the provisions of the quarantine laws and regulations of the United States to aircraft arriving at officially designated air ports of entry in the United States, or its possessions, from foreign countries with respect to quarantine inspection. Under the present quarantine laws and regulations of the United States the requirements for maritime vessels in general are applied to aircraft with the exception of the bill-of-health requirement. On February 1, 1929 a bulletin was issued by the aeronautics branch of the Department of Commerce summarizing all regulations of that department, the Customs Service, and the Public Health Service.

Amendment No. 12, issued December 26, 1928, amended paragraph 40 of the Quarantine Regulations to authorize quarantine officers to detain arriving persons having a communicable but nonquarantinable disease and persons having been exposed to such disease at the national quarantine stations when local authorities do not have facilities for their isolation and care. This amendment was promulgated in order to meet the emergency occasioned by the arrival of a large number of cases of cerebrospinal meningitis at Pacific coast ports of the United States from the Orient, which overtaxed the available facilities of the local health authorities, particularly at Seattle and San Francisco.

Amendment No. 13, issued January 24, 1929, amended paragraph 37 of the Quarantine Regulations to facilitate the passage through quarantine of vessels which carry a medical officer from ports classed as "uninfected," and permits quarantine officers some exercise of discretion, within limits, respecting the heretofore mandatory muster of passengers and crews of certain vessels arriving in quarantine. This amendment principally facilitates the passage through quarantine of North Atlantic vessels arriving at the port of New York.

MENINGOCOCCUS (CEREBROSPINAL) MENINGITIS

Beginning in November, 1928, vessels began to arrive at Pacific coast ports of the United States from the Orient with cases of cerebrospinal meningitis among steerage passengers. The number of these cases increased so rapidly as the winter season advanced that the local available facilities at the command of the local health authorities at the ports of Seattle and San Francisco became overtaxed, and

at the request of the local authorities the Public Health Service extended the use of the facilities at the Federal quarantine stations at these ports for the isolation and care of the cases and contacts in order to prevent the spread of this disease into the United States. Cerebrospinal meningitis is considered nonquarantinable, and therefore, in order to permit the detention of such cases at national quarantine stations, it was necessary to amend the Quarantine Regulations to provide for such treatment. Accordingly, amendment No. 12 was issued December 26, 1928, authorizing quarantine officers to detain arriving cases of communicable but nonquarantinable diseases and persons exposed to such diseases at the national quarantine stations when local authorities do not have facilities for their isolation and care.

By early spring the quarantine facilities of both the local and Federal health authorities became overburdened and the adoption of some other measures to prevent the spread of this disease into the United States was considered. This resulted finally in the promulgation of Executive Order No. 5143, under date of June 21, 1929, having for its purpose the restriction and supervision of the transportation of passengers from ports in China and the Philippines to United States ports under regulations prescribed by the Secretary of the Treasury. Although with the onset of the more favorable climatic conditions of the summer season the prevalence of this disease on shipboard decreased somewhat, nevertheless cases of the disease continue to arrive, and it is considered probable that with the onset of another winter season only strict enforcement of the provisions of the Executive order and the regulations issued thereunder will meet the situation. Executive Order No. 5143 reads as follows:

RESTRICTING FOR THE TIME BEING THE TRANSPORTATION OF PASSENGERS FROM
CERTAIN PORTS IN THE ORIENT TO A UNITED STATES PORT

Whereas there have arrived periodically at Pacific coast ports since November, 1928, a total of 17 trans-Pacific passenger-carrying vessels with epidemic cerebrospinal meningitis infection existing on board among oriental steerage passengers;

And whereas the continued arrival of vessels having epidemic cerebrospinal meningitis infection on board has overtaxed the combined available quarantine facilities of Federal and local health authorities, and that notwithstanding the quarantine defense, there exists danger of introducing this disease into the United States:

Therefore in order to prevent the further introduction of epidemic cerebrospinal meningitis from foreign ports into the United States, by virtue of the authority vested in me by section 7 of the act of Congress approved February 15, 1893, entitled "An act granting additional quarantine powers and imposing additional duties upon the Marine Hospital Service," it is ordered that no persons may be introduced, directly or indirectly, by transshipment or otherwise, into the United States or any of its possessions or dependencies from any port in China (including Hong Kong) or the Philippine Islands for such period of time as may be deemed necessary, except under such conditions as may be prescribed by the Secretary of the Treasury.

This order shall take effect from and after this date.

HERBERT HOOVER.

THE WHITE HOUSE,
June 21, 1929.

(No. 5143)

Subsequent to the issuance of this Executive order the Secretary of the Treasury issued regulations governing the embarkation of passengers and crew at ports in China and the Philippines and their transportation to United States ports.

COMMISSION ON SHIP FUMIGATION

At a meeting held at Geneva October 20 to November 30, 1927, the Health Committee recommended to the medical director of the health section of the League of Nations that he examine into the possibility of making a detailed study of the fumigation of vessels for the destruction of rats with particular reference to the fumigation of vessels with cargo in situ. As a result of this recommendation a special commission was appointed to carry out this investigation with Surg. Gen. Hugh S. Cumming as chairman.

The commission met at Paris May 14, 1928, for a preliminary discussion of the lines the study should follow. It was decided that—

(a) The chairman collect and analyze the available literature relating to the practical application and results of methods of fumigating ships by means of hydrogen cyanide;

(b) The commission accepted the offer of the United States Public Health Service to arrange for the planning and carrying out of experiments with regard to fumigating vessels by means of hydrogen cyanide in order to determine exactly certain special values of this fumigant, and to prepare a detailed program of experimental investigation in the light of the observations presented to the Commission at this meeting;

(c) Certain problems arising out of the inquiry, susceptible of solution by laboratory experiments, be included in the investigation as the need develops;

(d) The commission consider the evidence of possible damage or danger to health that might result from cyanide fumigation of food cargoes;

(e) An expert committee be selected to keep in touch with the practical studies, and to visit selected ports in various countries in order to obtain first-hand knowledge of local conditions and methods; and

(f) The commission consider the advisability of inviting the cooperation of shipowners in the inquiry.

A preliminary report of the investigation carried on in conformity with these recommendations was submitted to the commission at a meeting held at the League of Nations offices in Paris on May 15, 1929, comprising—

(1) Abstract of replies received from various countries in response to the request for information regarding the methods employed;

(2) Suggested program of experiments on ship fumigation;

(3) A tentative program of investigation of problems in ship fumigation at the New York quarantine station;

(4) Abstract of progress reports of investigation in progress at the New York quarantine station;

(5) An outline of the fumigation procedure followed at the New York quarantine station;

(6) Report of accidents resulting from fumigation of ships with hydrocyanic acid in the United States; and

(7) A compilation of references of the literature on fumigation of ships with reviews of certain articles.

The commission expressed its grateful appreciation of the report and approved the suggested program of experiments contained therein. The commission recommended that certain of its members and experts be invited to visit the United States in the spring of 1930 to study the execution of the program of special investigations and researches approved by the commission.

INTERNATIONAL OFFICE OF PUBLIC HYGIENE

At the October (1928) meeting of the Permanent Committee of the International Office of Public Hygiene, several recommendations were made concerning article 49 of the International Sanitary Con-

vention signed at Paris on June 21, 1926. These recommendations were:

- (1) That bills of health be issued free in all ports;
- (2) That fees for consular visas be reduced by way of reciprocity, so as not to represent more than the cost of the service rendered;
- (3) That the bill of health be made out in at least one of the languages known to maritime world, in addition to that of the country where it is issued; and
- (4) That special agreements in the spirit of article 57 of this convention be made with a view to doing away gradually with consular visas and bills of health.

The views of the Public Health Service with respect to these recommendations were expressed by the Surgeon General in a letter dated April 20, 1929, to the State Department and were to the effect: (1) and (2) that the Public Health Service views with favor the proposal to abolish or reduce the consular fees for visaing and issuing bills of health on a reciprocal basis. It was stated that it is believed that this action would remove a persistent source of irritation to the shipping interests; in view of the marked expansion of the merchant marine, it would be of pecuniary advantage to American shipping; and because of the persistent representations by the foreign shipping interests to their respective sanitary authorities for the relaxation of quarantine restrictions, it would be greatly appreciated by the foreign governments concerned; (3) that the Public Health Service is also of the opinion that it would be of distinct advantage to have the bill of health made out in a language known to the maritime world in addition to that of the country where it is issued; (4) that it is not believed that it would be practicable to do away with bills of health at the present time. It was stated that the epidemiological information furnished under the terms of the International Sanitary Convention of 1926 is not yet as complete as is desired for our maritime quarantine purposes, because but relatively few nations have ratified the convention. Moreover, the information furnished under the terms of the convention is not in all respects of the character desired and found helpful by our quarantine officers in arriving at decisions regarding the quarantine procedure to be employed in respect of arriving passengers, crew, and vessels under special circumstances. With regard to the acceptance of foreign certificates of deratization and exemption from deratization, it was stated that the Public Health Service will accept foreign certificates subject to the reservation of the signatory protocol to the International Sanitary Convention of 1926, to wit " * * * to decide what measures shall be applied to arrivals in its own ports under special circumstances."

With respect to recommendation No. 2 concerning the charges prescribed for consular visa by American consuls of certificates of deratization issued by foreign port authorities under the provisions of article 28 of the International Sanitary Convention of Paris, 1926, American consuls were authorized under Executive Order No. 5110, dated May 13, 1929, to visa without charge foreign certificates of deratization issued by foreign port authorities in accordance with the provisions of paragraph 104 of the quarantine laws and regulations of the United States administered by the Public Health Service. This change in practice went into effect July 1, 1929.

FLOATING EQUIPMENT

Continuing the policy adhered to during the past several years, the Public Health Service has been actually engaged in the work of reconditioning all older vessels whose condition justified such expenditure, and preparing plans and specifications for the new construction program. New vessels are in great need at a number of quarantine stations, but obsolete and unseaworthy vessels must remain in service until they can be replaced with adequate new floating property. Several of the most unseaworthy of the vessels were condemned during the year as being dangerous to further continued use, leaving a shortage of vessels which can not be met until funds for new construction are available. During the year a new boiler was put in the *Major Lester E. Moreton*, originally acquired from surplus, which should result in keeping this vessel in service an additional 10 years; and, following the policy of naming quarantine vessels for deceased service officers who have given meritorious service, the name of the vessel was changed to *J. J. Kinyoun*. Likewise, the *Beetle* was renamed *M. W. Glover* and the *Lieut. Edgar Koehler* was renamed *J. W. Branham*. The latter vessel, 65 feet in length, was rebuilt entirely; boiler and engine were replaced with a modern Diesel engine, and an appropriate superstructure replaced the original one. The *Branham* now is more economical to operate and maintain, and it presents a creditable appearance. The 35-foot launch *Cormorant* is now being rebuilt by station labor and will be renamed *Q-6*. The work of reconditioning other vessels is under way, and it is expected that several will be placed in service during the year.

New construction during the year consisted in the delivery of the 60-foot direct reversible Diesel tug *F. W. Meade* to the New York quarantine station, and during the last half of the fiscal year, contracts were entered into for the construction of a 40-foot Diesel-driven wood hull work boat, to be named *Q-7* and a 90-foot direct reversible Diesel tug with steel hull, to be used at the Boston quarantine station.

VIOLATIONS OF QUARANTINE LAWS

During the fiscal year the department assessed fines aggregating \$2,320 for violations of the act of February 15, 1893, because of the failure of masters of vessels to present American consular bills of health, and for other violation of the quarantine laws.

QUARANTINE TRANSACTIONS AT CONTINENTAL AND INSULAR QUARANTINE STATIONS

TABLE 1.—Summary of quarantine transactions at continental and insular stations for the fiscal year ended June 30, 1929

(1) INSPECTIONS

	Total number	Passed free pratique	Passed provisional pratique	Detained	Remarks
Vessels.....	22,466	17,354	5,941	215	Includes workaways. Includes stowaways.
Seamen.....	1,338,088			2,578	
Passengers.....	1,071,982			780	

TABLE 1.—*Summary of quarantine transactions at continental and insular stations for the fiscal year ended June 30, 1929—Continued*

(2) DETENTIONS

	Yellow fever		Typhus fever		Smallpox	
	Number	Days	Number	Days	Number	Days
Vessels.....	6	26			3	4¼
Seamen.....	360	180	6	6	69	544
Passengers.....	3	4			132	709
Sick.....	0	0			3	42

(3) LABORATORY

Number rats examined.....	17,888
Number fleas classified.....	3,636
Number persons vaccinated.....	115,989
Other examinations (name):	
Throat swabs examined for meningococcus at Manila.....	9,724
Stools examined for cholera at Manila.....	20,878

(4) TREATMENT OF VESSELS (FUMIGATING, TRAPPING, REMANDING)

(A) FUMIGATION

	Cyanide	Sulphur	Total
Vessels.....	3,175	1,323	4,498
Cubic feet fumigated.....	1,247,516,017.	349,003,118	1,596,519,135
Net tonnage.....	2,619,783	9,838,974	12,458,757
Rats recovered.....	19,169	3,596	22,765

(B) TRAPPING

Number of vessels.....	102
Net tonnage.....	443,898
Number traps.....	11,484
Number rats.....	245

(C) REMANDS FOR FUMIGATION

	Mandatory vessels	Periodical vessels	For other purposes
From other ports.....	1,375	323	326, by request.
To other ports.....	1,286	381	

(5) RESEARCH

The greater percentage of this work was done at the New York quarantine station; in addition a small amount of research was also accomplished at the Baltimore quarantine station and the Boston quarantine station:

1. Rat infestation survey as fumigation control.
2. Study of fumigation methods and effectiveness.
3. Study of fumigation applied to loaded ships.
4. Study of rat proofing on ships.
5. Study of presence of mosquitoes on arriving ships.

(6) FINANCIAL REPORT

Total amount of bills rendered for quarantine services..... \$559,150.44

(7) PORT SANITARY STATEMENTS AND BILLS OF HEALTH ISSUED

Number issued..... 49,723

(8) MEDICAL EXAMINATIONS OF ALIENS AT QUARANTINE STATIONS

	Total examined	Intensive	Class certified				Total certified
			A-I	A-II	B	C	
Number passengers.....	91,000	9,874	7	119	164	161	451
Number alien seamen.....	476,065	186,084	96	1,139	162	181	1,578

TRANSACTIONS AT CONTINENTAL MARITIME STATIONS

TABLE 2.—Summary of transactions at continental maritime stations for the fiscal year ended June 30, 1929

Station	Vessels inspected	Vessels fumigated		Passengers inspected	Crew inspected
		Cyanide	Sulphur		
Aberdeen, Wash.....	58	0	15	0	2,431
Angel Island, Calif. (San Francisco).....	576	380	20	39,751	39,567
Astoria, Oreg.....	119	11	22	17	5,127
Baltimore, Md.....	752	293	0	209	24,887
Beaufort, S. C.....	0	0	0	0	0
Boca Grande, Fla.....	22	0	1	10	511
Boston, Mass.....	1,047	159	0	47,534	71,464
Brunswick, Ga.....	17	0	5	1	589
Carabelle, Fla.....	0	0	0	0	0
Cedar Keys, Fla.....	0	0	0	0	0
Charleston, S. C.....	167	0	21	102	5,225
Corpus Christi, Tex.....	33	0	0	12	1,045
Eastport, Me.....	1	0	0	0	0
Eureka, Calif.....	4	1	0	0	143
Fall River, Mass.....	39	0	0	9	1,381
Fernandina, Fla. (Cumberland Sound).....	1	0	0	0	37
Fort Bragg, Calif.....	0	0	0	0	0
Fort Monroe, Va.....	478	0	139	314	18,706
Freeport, Tex.....	29	0	0	0	996
Galveston, Tex.....	800	165	0	944	29,729
Georgetown, S. C.....	8	0	0	0	56
Gloucester, Mass.....	0	0	0	0	0
Gulfport, Miss.....	59	0	31	0	1,587
Jacksonville, Fla. (St. Johns River).....	189	47	0	48	14,476
Key West, Fla.....	235	0	7	24,008	13,405
Lewes, Del. (Delaware Breakwater).....	3	0	0	0	44
Marcus Hook, Pa.....	1,171	9	401	628	39,490
Marshfield, Oreg. (Coos Bay).....	32	0	5	1	1,302
Miami, Fla.....	1,412	12	3	28,344	21,501
Mobile, Ala.....	298	30	36	190	8,887
Monterey, Calif.....	0	0	0	0	0
Morgan City, La. (Atchafalaya).....	0	0	0	0	0
New Bedford, Mass.....	1	0	1	86	48
New London, Conn.....	26	0	0	5	1,262
New Orleans, La.....	2,255	407	0	14,732	84,918
Newport, Oreg.....	0	0	0	0	0
Newport, R. I.....	3	0	0	7	60
New York, N. Y. ²	4,887	873	0	617,074	607,402
Ogdensburg, N. Y.....	21	0	0	0	393
Panama City, Fla.....	18	8	0	0	323
Pascagoula, Miss.....	2	0	0	0	10
Pensacola, Fla.....	94	47	0	15	2,785
Plymouth, Mass.....	9	0	0	0	332
Portland, Me.....	114	0	13	73	3,783
Portland, Oreg.....	40	56	16	6	1,387
Port St. Joe, Fla.....	0	0	0	0	0
Port Townsend, Wash. ³	324	174	76	8,650	21,986
Providence, R. I.....	77	0	0	7,947	5,885
San Diego, Calif. (Point Loma).....	1,454	0	3	19,465	17,067
San Luis Obispo, Calif. (Port San Luis).....	3	0	0	0	114
Sabine, Tex.....	279	24	0	372	10,054
San Pedro, Calif.....	1,538	165	0	12,538	58,823
Santa Barbara, Calif.....	1	0	0	0	42
Savannah, Ga.....	142	12	1	50	4,040
South Bend, Wash.....	6	0	1	0	235
Southport, N. C. (Cape Fear).....	59	0	15	31	1,913
Tampa, Fla.....	371	84	2	354	8,557
Vineyard Haven, Mass.....	0	0	0	0	0
Washington, N. C.....	0	0	0	0	0
West Palm Beach, Fla.....	255	0	0	141	901
Total.....	19,529	12,957	834	823,668	1,134,906

¹ 2 vessels fumigated with KMnO₄ not included.² Includes the inspection of 74 vessels, 2,281 crew, and 1,287 passengers at Perth Amboy.³ Includes the inspection of 19 vessels, 1,287 crew, 246 passengers, and 235 fumigations at Seattle.

REPORTS FROM CONTINENTAL QUARANTINE STATIONS

Aberdeen, Wash.—Acting Asst. Surg. J. B. Kinne in charge. Post-office and telegraphic address, Aberdeen, Wash.

This quarantine station serves the three cities of Hoquiam, Aberdeen, and Cosmopolis. The majority of vessels entering these ports

arrive in ballast and are engaged in the oriental lumber trade, practically all loading lumber for Japan. Being lumber-carrying ships, they did not as a rule harbor many rats. In addition, 14 British, 2 Danish, 3 Norwegian ships, and 1 Swedish ship entered this port during the year.

During the fiscal year no quarantinable diseases were encountered.

Baltimore, Md.—Surg. H. F. White in charge. Post-office and telegraphic address, Curtis Bay, Baltimore, Md.

The amount of shipping entering the port of Baltimore during the past year was normal. These vessels brought cargoes from many countries and consisted chiefly of ferromanganese ore from England; iron ore from Cuba, Chile, and Europe; magnesite from Italy; pyrites from Spain; crude oil from Mexico, Colombia, and Venezuela; fruit from Cuba, Jamaica, Guatemala, and Honduras; lumber from British Columbia, the Philippines, and South America; and general cargo from various ports of the world. These vessels were inspected upon arrival at quarantine and received any necessary treatment. Cooperation received from the shipowners and agents greatly facilitated the handling of these vessels through quarantine and a minimum of delays was occasioned during the year.

A total of 752 vessels were inspected during the year, of which number 293 were fumigated—291 with Zyklon B and 2 with a mixture of liquid hydrocyanic-acid gas with 5 per cent chloropicrin, the latter being used as an experiment to determine its practicability. The tests proved it effective as a fumigant; atomization was apparently complete, measurements were accurate, warning gas was present and very effective. There was no waste of gas and no difficulty was experienced in clearing the ships, though very little wind was blowing and the atmosphere was damp on the day the tests were made. The time required to fumigate was found to be about the same as for Zyklon B.

It was not found necessary to detain anyone or any ship for a quarantinable disease during the year. The general sanitary condition of vessels entering quarantine was good. The passenger traffic has been largely incidental to cargo vessels having limited accommodations and carrying only a few passengers.

On August 24, 1929, the American Steamship *Steel Inventor*, from Rio de Janeiro and Buenos Aires, loaded with manganese ore, was fumigated at the quarantine anchorage upon arrival. Thirty minutes after fumigation was started, 16 stowaways were discovered in the after hold. These stowaways had been effectively hidden by members of the crew so that they could not have been discovered prior to fumigation by practicable and customary search. All of them were soon overcome by the gas, and it was only through heroic efforts on the part of fumigators attached to the station that any of the stowaways were saved. The gas proved fatal to 7 of the 16.

The majority of fumigations performed at this station are on vessels which have been remanded from other United States ports; this is due to the fact that in many instances Baltimore is the port at which final discharge of cargo is made, the least of the cargo on board being for this port. Very few rats were recovered on ships fumigated at this port; the rat population was noticeably low, possibly because of the nonrat-attractive character of the cargoes principally carried. A new type of gas mask has been substituted for the old Army type and has been found satisfactory.

Many rats were trapped in and about the wharves of Baltimore, from which a large number of fleas were obtained. Only 12 *Rattus rattus alexandrinus* have been caught; the infestations were found to be the *Rattus norvegicus*. Final identification of the fleas and other ecto parasites collected was made by the laboratory division of the New York Quarantine Station. Of the fleas identified, the *Ceratophyllus fasciatus* have been found to be predominant.

The Diesel tug *John M. Eager* was transferred to the New Orleans Quarantine Station, and the steam tug *McClintic*, which had been condemned, was sold at public auction. The Diesel tug *Thomas Welch* continues to be an ideal boat for quarantine purposes. During the year this latter boat was sheathed with an ice-protective booting.

Beaufort, S. C.—Acting Asst. Surg. M. G. Elliott in charge. Post office and telegraphic address, Beaufort, S. C.

The Beaufort Quarantine Station principally serves the ports on Port Royal Sound, formerly of considerable importance in the export lumber trade. During the current fiscal year there were no transactions at this station.

Boca Grande, Fla.—Acting Asst. Surg. H. P. Bevis in charge. Post office and telegraphic address, Boca Grande, Fla.

The shipping entering this port is largely engaged in the phosphate trade and constitutes but a comparatively slight quarantine risk, carrying for the most part nonrat-attractive cargoes. During the fiscal year 22 vessels arrived from foreign ports of which 1 was fumigated and 4 were remanded to other United States ports for fumigation after discharge of cargo.

Boston, Mass.—Surg. A. R. Sweeney in charge. Post office and telegraphic address, Gallops Island, Boston, Mass.

This station is located 1 mile from the mainland and 5 miles from the Army base, Boston, where the quarantine boats tie up. Fumigations of vessels are usually done at the docks, occasionally at the quarantine anchorage.

Considerable improvement has been noted in the class of vessels entering this port; many have made notable progress in ratproofing, with consequent reduction in the necessity for fumigation. The principal passenger liners and a large number of freight vessels enter Boston as the first port of call, thence proceed to New York and other near-by ports for completion of discharge. Two vessels were detained on account of smallpox and two cases of this disease were removed to the quarantine station; the vessel was disinfected and all passengers and crew were vaccinated. No new cases developed.

During the year 1,047 vessels were inspected, on which were examined 71,464 seamen and 47,534 passengers. Of the passengers inspected in quarantine, approximately 25 per cent were examined intensively for vermin infestation. The system of making combined quarantine and immigration inspection, inaugurated during the preceding fiscal year, has been continued with satisfaction.

The medical officer in charge of the Boston Quarantine Station visited from time to time the subports of Beverly, Salem, and Lynn. The quarantine work at these subports is now completely organized and coordinated.

At the Boston Quarantine Station 161 vessels were fumigated, Zyklon-B and cyanogen chloride being the fumigants used. Experiments have been conducted to determine the effect, if any, of these

fumigants on foodstuffs. Experiments to determine the comparative efficiency of cyanide and carbon sulphide and tetrachloride gases were also made.

Brunswick, Ga.—Acting Asst. Surg. R. E. L. Burford in charge. Post office and telegraphic address, Brunswick, Ga.

The foreign commerce entering this port has increased considerably in recent years. This is largely due to imports of sugar from Cuba, crude oil from Mexico, and nitrates from Germany. The vessels engaged in this trade are steamships of large tonnage and of modern construction, having only a minimum harborage for rats, and from the standpoint of plague are therefore relatively safe quarantine risks. No quarantinable diseases were encountered during the year.

Charleston, S. C.—Surg. J. H. Oakley in charge. Post office and telegraphic address, Charleston, S. C.

Foreign commerce entering this port consists principally of crude oil from Peru, Colombia, and Mexico, cement from Belgium, bananas from Central American ports, fertilizer material from Germany and Chile, and a small amount of general cargo from England. Occasionally a vessel arrives with jute bagging from India.

Most of the vessels are considered relatively safe quarantine risks, having complied with the United States quarantine rules and regulations at ports of departure and having been fumigated regularly, excepting vessels from rat-plague ports, especially those few from India, which are fumigated each voyage.

Columbia River, Oreg.—Acting Asst. Surg. R. J. Pilkington in charge. Post office and telegraphic address, Astoria, Oreg.

The headquarters for quarantine procedures at Columbia River ports was moved from Astoria to Portland early in the fiscal year, thus enabling inspection and fumigation of vessels to be made at both ports. Statistics show that about 80 per cent of all vessels from foreign ports entering the Columbia River are destined for Portland. Prior to the establishment of a quarantine station at Portland vessels entering the Columbia River after sunset were required to wait overnight for quarantine inspection the following morning at Astoria. Now these vessels may steam up the river all night and go directly to Portland for quarantine inspection, thereby eliminating much delay.

Practically all vessels entering Astoria are freighters which have called at other United States ports prior to entry at Astoria, and hence have received the necessary quarantine inspection before entry at this port. This is particularly true with regard to grain vessels and to a lesser extent to lumber vessels. This practice has obtained in recent years only; formerly vessels entering this port were tramps, coming direct from foreign ports and taking on full cargo.

The historic old gunboat *Concord*, used as a quarantine barracks at Knappton since 1914, was condemned and sold during the year. With the opening of the new quarantine station at Portland and the inauguration of cyanide fumigations there, the quarantine boarding launch *Donald Currie* was temporarily transferred to that port but after a few months it was returned to Astoria for boarding duty.

Coos Bay, Oreg.—Acting Asst. Surg. Everett Mingus in charge. Post office and telegraphic address, 125 Broadway, Marshfield, Oreg.

No foreign cargoes entered this port during the year, all vessels arriving empty and departing with timber products and scrap iron.

The vessels are of steel construction with large open hatches and compartments and their general sanitary condition shows quite an improvement over preceding years. Inspection shows all the new motor ships to be in excellent sanitary condition. Evidence of rat infestation is found for the most part on the main deck, where are located the food storerooms, galleys, pantries, and crew's quarters. Practically all ships from foreign ports come from the Orient and consume about 20 days in making the trip. Sulphur is used exclusively for fumigations at this port.

Corpus Christi, Tex.—Acting Asst. Surg. M. J. Perkins in charge. Post-office and telegraphic address, Corpus Christi, Tex.

The major portion of shipping entering this port is coastwise; the principal business is exports. During the year 22 vessels were inspected, only one of these requiring fumigation which was remanded to the next port of call in the United States for fumigation. Fumigations are done with sulphur.

Cumberland Sound, Fla.—Acting Asst. Surg. D. G. Humphreys in charge. Post-office and telegraphic address, Fernandina, Fla.

The foreign commerce entering this port consists principally of vessels from European ports calling for phosphate cargoes. All entered coastwise with the exception of one, which was required to undergo inspection. No fumigations were performed. Because of their construction and the nature of their cargoes, these vessels presented but slight quarantine risks as regards plague.

Eastport, Me.—Acting Asst. Surg. John E. Brooks in charge. Post-office and telegraphic address, Eastport, Me.

The majority of vessels entering this port are small freighters from Canada, which are not required to undergo quarantine inspection. Some of these vessels in addition to carrying freight also carry a few passengers. During the year only one vessel arrived from foreign ports requiring inspection. No quarantinable disease was encountered.

Eureka, Calif.—Acting Asst. Surg. Charles C. Falk in charge. Post-office and telegraphic address, 407 First National Bank Building, Eureka, Calif.

During the year four vessels arrived from foreign ports requiring inspection. One of these vessels was fumigated, sulphur being the fumigant used. Vessels entering the port of Eureka are principally engaged in the lumber trade.

Fall River, Mass.—Acting Asst. Surg. Thomas Cox in charge. Post-office and telegraphic address, 1244 Pleasant Street, Fall River, Mass.

During the fiscal year a total of 39 vessels arrived. The crews of these vessels numbered 1,381 persons; 9 passengers were carried. These ships were all oil tankers sailing chiefly from Aruba and Curacao, Danish West Indies, and, owing to the character of the cargo, the attending quarantine risks were slight.

Fort Monroe, Va.—Surg. J. W. Kerr in charge. Post-office and telegraphic address, Fort Monroe, Va.; hospital and detention barracks at Craney Island, Norfolk, Va. This station serves the ports of Norfolk and Newport News, Va.

All boarding and inspection for pratique purposes is done in the quarantine anchorage off Fort Monroe. All fumigations are done with sulphur in this anchorage. During the year a total of 478 vessels from foreign ports were inspected, on which were 296 pas-

sengers and 18,702 crew. No quarantinable diseases were found. A total of 139 vessels were fumigated for the destruction of rodents and 12 vessels were inspected and granted deratization exemption certificates. In addition, nine vessels were trapped for rodents and five vessels were guarded by inspectors at wharves during partial discharge of cargo. Of the total vessels inspected, 94 called for bunkers only, practically all of them leaving direct for foreign ports. While in port they lay at steel piers, remaining for a few hours only. The danger from these vessels is very small.

At the request of the builders, the steamship *Virginia* and the motor ship *Elwood* were inspected at the Newport News Shipbuilding & Drydock Co., and the steamship *Defiance* was inspected at the navy yard, Portsmouth, Va., to advise with respect to rat proofing these vessels, which are under construction by the respective builders.

On September 19, 1928, the launch *Cormorant* was transferred to the United States quarantine station, Curtis Bay, Baltimore, Md., and the launch *Widgeon* was transferred to the United States quarantine station, Jacksonville, Fla., on November 3, 1928.

Galveston, Tex.—Acting Asst. Surg. Fleetwood Gruver in charge. Post-office and telegraphic address, Galveston, Tex.

The quarantine station at Galveston is situated about 2 miles from the city at the extreme end of Pelican Spit on filled land. This point is inclosed on the north, east, and part of west sides by a riprap of granite cubes which form an admirable breakwater. On the remaining part of west side is a fill to a height of from $2\frac{1}{2}$ to 3 feet of gravel and loose rock. On the east side of the station is a wharf about 125 by 10 feet, set on piles, about 25 feet from the riprap retaining wall and parallel to it. The station site has within the past year or 18 months been converted into a small island caused by the water at high tides cutting through the neck of land connecting the quarantine station with United States Coast Guard station. Beginning in a small break of less than 3 feet about a year ago, this gap has been widened by strong northeast tides within the past year and now forms a complete channel through which small boats can pass at high tide. However, steps are being taken to remedy this, a contract having been let to build a steel bulkhead from the southeast corner of station grounds to the Coast Guard reservation, a distance of about 2,700 feet, and to fill the lowland with dredgings from the channel in front of the station. For additional fire protection a small engine has been installed recently, with which water can be pumped directly from the channel. While this alone is not adequate for fire protection, it will serve well in case of fire until the station fire pump can be manned and started. The station is lighted by electricity supplied from Galveston, but is equipped with a small lighting plant in the event that the city supply fails, which has occurred several times during the past year.

All vessels from foreign ports destined to Galveston and other points on the Houston ship channel are inspected in the Bolivar Roads quarantine anchorage, just off the quarantine station. Comparatively few vessels engaged in foreign trade arriving at this station carry passengers, practically all the vessels being cargo carriers. During the year 800 vessels arrived from foreign ports and were inspected, of which number 165 were fumigated, 901 rats being recovered after fumigation. The Zyklon-B method of hydrocyanic-acid gas fumigation is used.

Gulfport, Miss.—Acting Asst. Surg. C. A. Sheely in charge. Post office and telegraphic address, Gulfport, Miss.

Quarantine inspections are conducted in the channel off Gulfport, Miss., and the detention station at Ship Island is maintained under the charge of two caretakers.

During the year 59 vessels from foreign ports were inspected, of which number 31 were fumigated with sulphur. No quarantinable diseases were encountered.

Jacksonville, Fla.—Acting Asst. Surg. R. S. Wynn in charge. Post office and telegraphic address, Jacksonville, Fla.

The station is located at the United States Army Engineer's Dock, and the service is allowed the use of their facilities and equipment at this dock. Ships are boarded as soon as possible after they anchor between sunrise and sunset. The majority arrive between 7 and 8 a. m., on account of the length of time it takes for them to come up the river after crossing the entrance bar at daybreak, which is about two to three hours, depending on the tide. The quarantine anchorage is opposite the station.

The foreign commerce consists principally of fertilizer material and oil; many schooner-type vessels enter from Central and South America. There was a slight increase in shipping this year over the preceding fiscal year, 189 vessels having been inspected and 47 fumigated. Hydrocyanic-acid gas was used.

During the fiscal year the quarantine gas launch *William Riera* became unserviceable through age and was condemned. It was replaced with the quarantine gas launch *Widgeon*, transferred from the Fort Monroe Quarantine Station.

Key West, Fla.—Acting Asst. Surg. J. Y. Porter, jr., in charge. Post office and telegraphic address, Key West, Fla.

Boarding and inspection is done in the stream and at the dock; fumigations are always done in the stream. Airplanes are inspected at the Meacham Airport, located some 5 miles distant on the south-eastern part of the island of Key West.

Vessels entering this port are principally steamships and small yachts from Cuba, the former bringing fruit and merchandise; oil tankers and schooners from Mexico bring crude oil and cedar logs; fruit and turtle schooners come from Central America and Cayman Islands, and steamships in ballast from European ports enter for bunkers and orders. The great majority of these vessels are of steel-hull type, with slight rat harborages and practically no rat infestation. However, the turtle and lumber schooners are of wood and they afford extensive rat harborages.

During the fiscal year 235 vessels arriving from foreign ports required inspection, of which number 7 were fumigated with sulphur. A total of 24,008 passengers and 13,405 crew were inspected. No quarantinable diseases were encountered.

Marcus Hook, Pa.—Surg. D. J. Prather in charge. Post office and telegraphic address, Marcus Hook, Pa.

The quarantine station at Marcus Hook, Pa., is the boarding and detention station for Philadelphia, Chester, Wilmington, and all other ports on the Delaware River. Additional detention facilities are maintained at Reedy Island. Marcus Hook is 17 miles below Philadelphia, and the Reedy Island Quarantine Station is 40 miles below Philadelphia. An office is also maintained at the customhouse,

Philadelphia, for the supervision of fumigations, making rat-infestation inspections, general supervision of shipping while in port, and the issuing of port sanitary statements. The Marcus Hook Quarantine Station is also the administrative office for the Reedy Island Quarantine Station, the fumigating force in Philadelphia, and the medical examination of aliens in Philadelphia, including the examination and medical care of aliens at the immigration detention station at Gloucester, N. J.

All vessels bound for ports on the Delaware River are boarded and inspected at Marcus Hook, while the necessary fumigations and rat-infestation inspections are made at the docks in Philadelphia, Chester, Marcus Hook, Wilmington, and Paulsboro. There has been little change in the character of foreign commerce arriving during the year, which consists principally of fruit, crude oil, sugar, ore, molasses, cork, china clay, quebracho, and linseed. A total of 1,171 vessels were inspected during the fiscal year and 410 were fumigated. The crews of these ships numbered 39,490; 628 passengers were carried. Fumigations at this port have been performed by sulphur, the equipment being transported to ships from a rented storeroom by a commercial truck. These arrangements have not proved entirely satisfactory, and toward the close of the fiscal year plans were being considered for the reorganization of fumigation activities and the inauguration of the use of Zyklon-B.

During the year there was an exchange of the Diesel tugs at the Boston Quarantine Station and the Marcus Hook Quarantine Station, the Diesel tug *Eugene Wasdin* being transferred from Boston to Marcus Hook and the Diesel tug *David Townsend* was transferred from Marcus Hook to Boston. The *David Townsend* is of somewhat heavier construction and is better adapted to meet the ice conditions found during the winter months in Boston Harbor. A new boiler was installed in the steam boarding tug *J. M. Woodward*, and this vessel is now in excellent condition. The steam tug *Lieut. Edgar F. Koehler* was rebuilt entirely during the year; boiler and engine were replaced with a modern Diesel engine, and an appropriate superstructure replaced the original one, following which this vessel was renamed *J. W. Branham*, in honor of a deceased officer of this service who died of yellow fever contracted in line of duty.

Miami, Fla.—Acting Asst. Surg. F. R. Maura in charge. Post office and telegraphic address, Miami, Fla.

There is no anchorage available at this port, and so quarantine boarding of vessels is done at the docks. Vessels are also boarded at Miami Beach, Fishers Island, and an occasional vessel at Port Everglades, Hollywood, Fla. During the year the Pan American Airways established an airport at Hialeah, Fla., about 8½ miles from Miami, carrying mail and passengers from Cuba, Porto Rico, and Central and South American ports. This has added considerably to the work at this station. Passenger traffic constitutes the most important phase of the quarantine work at this port.

Mobile, Ala.—Surg. F. M. Faget in charge. Post office and telegraphic address, Mobile, Ala.

Vessels arriving at this station requiring inspection are boarded in the main ship channel at some distance below the station. Quarantine operations are conducted while the vessel is under way and completed prior to arrival in Mobile Harbor proper. In this manner the

loss of time to shipping at quarantine is reduced to a minimum. Vessels requiring fumigation are usually allowed to proceed to Mobile, in order to discharge cargo under proper precautions, and are then fumigated at their dock. About 60 per cent of the vessels inspected are fruit ships from Mexican and Central American ports, the remainder being made up of ore boats from African ports, molasses boats from Cuba, and a few vessels from European ports in ballast or from Argentine ports with dyewood.

The lack of a suitable basin or ship anchorage near the station, and the lack of a ship dock at the station, alongside which vessels requiring quarantine treatment or detention could be tied up, tends to detract from the efficiency of operations.

During the year a total of 298 vessels arrived at this port requiring inspection; 66 of these were fumigated.

The Diesel tug *J. F. Groenevelt*, which was added to the station's floating equipment during the preceding fiscal year, has given excellent and economical service during the year and a half continuous service at this station.

New Bedford, Mass.—Acting Asst. Surg. E. F. Cody in charge. Post office and telegraphic address, 105 South Sixth Street, New Bedford, Mass.

The quarantine activities at the port of New Bedford was taken over by the Public Health Service during the preceding fiscal year from the local board of health. During the fiscal year 1929 but one vessel arrived from foreign ports, this vessel coming from Fogo, Cape Verde Islands, with 86 passengers and 48 in crew. This vessel was fumigated with sulphur.

New London, Conn.—Acting Asst. Surg. J. M. Ganey in charge. Post office and telegraphic address, New London, Conn.

New London is fast becoming an important commercial center; all of the leading oil industries have established shipping centers here to supply New England, these tankers having added considerably to the quarantine work at this station. Coastwise shipping is always active. During the year 26 vessels arrived from foreign ports carrying 1,262 crew. But five passengers were carried.

New Orleans, La.—Surg. C. R. Eskey in charge. Post office and telegraphic address, room 305, customhouse, New Orleans, La.

The New Orleans Quarantine Station has jurisdiction over all vessels from foreign ports entering the Mississippi River. The majority of these vessels dock at the wharves of New Orleans proper, which extend approximately 10 miles along the river. A considerable number of vessels, chiefly tank ships, are bound for Baton Rouge and a few dock at private wharves, which begin 18 miles below New Orleans and extend 35 miles above the city.

The activities of the quarantine station are divided into four widely separated units, as follows: The administrative office is located in the customhouse; the fumigation division is housed at 911 Chartres Street; the upper quarantine boarding station is at Flood Street and the Mississippi River in New Orleans; and the lower boarding station and detention barracks are located at Quarantine, La., 90 miles below New Orleans.

The bulk of the work connected with the quarantine treatment of vessels is centered at New Orleans, but quarantine transactions at the lower station are also considerable. During the year 444 vessels,

or 18 per cent of the total vessels inspected at this station, were examined at the lower station at Quarantine, La. Inspection service is maintained at Quarantine, La., for vessels arriving with perishable cargoes, which would arrive at the upper station after sunset, thus obviating the delay and expense incident to awaiting overnight for quarantine inspection the following morning. A few tank vessels bound for wharves below New Orleans and a few other vessels for miscellaneous reasons are inspected at the lower stations, and during the yellow-fever quarantine season vessels which have visited infected ports are inspected and treated at the lower station. Since July 1, 1928, 42 vessels coming from South American ports infected with yellow fever have been fumigated for the destruction of mosquitoes, 26 of these vessels were treated for rats in conjunction with mosquito fumigation, thus eliminating a second fumigation after discharge of cargo at New Orleans. Three vessels and their personnel were detained six days at quarantine because of having come from ports infected with yellow fever. Plague has been reported present this year at many ports which have more or less direct commercial relations with New Orleans. Since July 1, 1928, 37 loaded vessels from plague-infected ports have been fumigated upon arrival. No quarantinable diseases were encountered upon these vessels, however.

Of the 2,255 vessels inspected at quarantine during the past year, 561 were tankers with cargoes of petroleum, molasses, creosote, or in ballast; 1,277 were from ports in the West Indies, Mexico, Central America and South America adjacent to the Caribbean Sea with cargoes of fruit, raw sugar, logs, sisal, coffee, and bauxite; 229 were from ports in northern Europe with miscellaneous cargoes of crude chemicals, cement, iron products, seeds, crockery, toys, canned foods, etc.; 25 were from Mediterranean ports with cargoes consisting chiefly of cork, olives, lemons, marble; 21 were from the Far East with cargoes of copra, jute bags, hemp, raw sugar, and coconut oil; 72 were from ports on the east coast of South America with cargoes of coffee, crude animal products for fertilizers, canned meat, and linseed; and 6 were from unclassified ports, including ports in Africa, with miscellaneous cargoes.

During the fiscal year 1927 a site was acquired by the Treasury Department for a new station at New Orleans. This site is located on the west side of the Mississippi River about 4 miles below the New Orleans customhouse, and the location is generally much better for a quarantine station. It is necessary for efficiency of service and economy of administration that a new station be built as soon as practicable on the site acquired, for which the preparation of plans is nearing completion. In May a contract was let for building a wharf at the new quarantine station site.

The steam tug *Von Ezdorf* was surveyed by a board on October 24, 1928, and was found no longer serviceable for quarantine purposes and accordingly was sold at public auction February 20, 1929. The Diesel tug *John M. Eager* was transferred to this station from the Baltimore Quarantine Station and has proved very satisfactory and economical for quarantine purposes.

Newport, R. I.—Acting Asst. Surg. Edward Murphy in charge. Post office and telegraphic address, Newport, R. I.

The quarantine work at this station has decreased to some extent during the last few years. This is probably due to the fact that oil

tankers from Mexico now enter this port coastwise, having received the necessary quarantine treatment at a port of previous call in the United States. The majority of vessels now entering Newport are pleasure yachts; occasionally a larger boat in need of supplies puts into port. The quarantine risks from these vessels are very slight. But three vessels arrived direct from foreign ports requiring inspection.

New York, N. Y.—Surg. Carroll Fox in charge. Post office and telegraphic address Rosebank, Staten Island, N. Y.

The administrative, boarding, inspection, laboratory, and fumigation headquarters of the station are located at Rosebank, and the hospital and detention units are located at Hoffman Island, 3 miles below the station. An office is also maintained in the customhouse for the issuance of port sanitary statements to outbound vessels. An inspection station at Perth Amboy, N. J., is also under the supervision of this station, and in those instances in which fumigation of arriving vessels is required, squads are sent from Rosebank for the performance of this work. Swinburne Island remains inactive, but inspections of the property are made from time to time by officers at Rosebank. In recent years a number of vessels have arrived at City Island, N. Y., and have been given the required quarantine inspection.

The activities of the station are effected through nine divisions: (1) Boarding; (2) laboratory; (3) fumigation and ship inspection for rat infestation; (4) rat proofing of vessels; (5) personnel and accounts; (6) material; (7) buildings, grounds, and mechanical equipment; (8) floating property; and (9) hospital and detention (Hoffman Island).

During the year 4,813 vessels arrived at Rosebank from foreign ports requiring inspection. Vessels with an aggregate net tonnage of 2,943,238 tons and a cubic capacity of 367,745,320 cubic feet were fumigated by the use of Zyklon-B, generated HCN and liquid hydrocyanic acid, with the result that 9,625 rats were secured. A total of 873 vessels were fumigated, of which 832 were fumigated with Zyklon-B, 39 with generated HCN, and 2 experimentally with liquid hydrocyanic acid. Because of plague in Rosario, Argentina, vessels arriving from this port were required to fumigate while loaded and were permitted to unload only under guard. When empty, these ships were carefully inspected and refumigated upon discovery of evidence of continued rat infestation. The system of determining the necessity for the periodic six months' fumigation of vessels by inspection for rat infestation has been carried out during the year. During the fiscal year, 833 inspections were made, of which in 529 fumigation was postponed on account of absence of rat evidence, 280 were fumigated, 7 were trapped in lieu of fumigation, and 17 were remanded to other stations for fumigation.

Amendment No. 13 to the quarantine regulations, promulgated during the year, proved an important factor in expediting the passage through quarantine of regular line passenger vessels classed as "uninfected" which carry a medical officer. The time required for the inspection of these vessels was materially shortened thereby.

The laboratory has continued the examination for plague infection of rats found after fumigation, but with negative results. A rat and rat-flea survey of ships fumigated at New York was completed and the report was published in the Public Health Reports of March 1, 1929. Identification of fleas from other stations has continued, and

information relative to rat-flea surveys, as well as mounted specimens and other data and material, has been furnished to various stations, individual officers, and interested persons in this and foreign countries.

A special investigation of fumigation particularly as applied to loaded ships has been undertaken and is well under way. The principal development to date is the demonstration that on loaded ships 80 per cent of the rats can be killed by careful fumigation and that the fumigant (HCN) introduced via the ventilators and sounding pipes into the loaded holds and the bilges clears from the lower levels before they can be reached by unloading operations.

Toward the end of the year a survey for mosquitoes on incoming ships and ships at certain foreign ports was commenced. In this survey the United Fruit Co. is rendering valuable assistance.

The work of the rat-proofing division has been carried on very energetically during the year. At the beginning of the present year 145 vessels touching at this port were carrying on rat-proofing work. The number had increased to 194 on June 30, 1929. Frequent inspections were made on each of these ships. In addition, rat-proofing surveys were made on 110 vessels. During the year American shipyards turned out three vessels that were rat proofed under contract for original construction or rebuilding, and European yards seven such vessels. Rat-proofing work is being carried out on 6 American vessels and 20 foreign ships now under construction.

As a result of the working out of a plan and the preparation of a complete set of technical drawings covering rat proofing of vessels, the technique of the work is now better understood by shipbuilding companies and naval constructors. Specifications for rat proofing vessels were approved by the American marine standards committee of the Department of Commerce on February 8, 1929, and promulgated as a standard of that committee (American Marine Standard H No. 41—1929).

The hospital and detention division maintains the hospital, detention barracks, and the delousing and disinfection plant on Hoffman Island. During the year 147 persons were detained, 4 persons deloused, and 12 patients treated in the isolation hospital. The standee bunks formerly located on the hulk *Lancaster* are in process of erection in one of the detention buildings. New showers have been installed in the delousing plant and considerable improvement has been made to the grounds.

The floating property at this station consists of 4 boarding tugs, 1 Diesel motor launch, 1 semi-Diesel motor launch, and 1 gasoline motor launch. The Diesel tug *F. W. Meade* was built during the year and was designed for service between Rosebank and Hoffman Island. One of the steam boarding tugs, the *Walter Wyman*, has been condemned unconditionally by a board of survey and one other, the *M. W. Glover*, was condemned by the same board, with the provision that it might be used as an occasional relief boat for a limited period, being regarded as not worthy of any extensive repairs. The steam boarding tugs *Carter* and *Kinyoun* and the Diesel tug *Bratton* were thoroughly overhauled during the year and are in good condition.

Ogdensburg, N. Y.—Acting Asst. Surg. R. L. Stacy in charge. Post-office and telegraphic address, Ogdensburg, N. Y.

The Ogdensburg quarantine station serves all vessels from foreign ports bound for United States ports on the Great Lakes. It is only a boarding station for quarantine inspection and fumigation; there are no facilities available for detention or hospitalization.

During the year no passenger vessels arrived at this port, all being small freighters. There were 14 Norwegian steamers, 6 English, 1 Swedish; the cargoes were chiefly china clay, iron pipe, and coal. The quarantine risks at this port are small, as the majority of vessels sailed from the northern part of Europe, and in addition before entering at this port they have been examined by the Canadian authorities at their completely equipped quarantine station at Father Point, located on the St. Lawrence some distance below Ogdensburg.

Pensacola, Fla.—Acting Asst. Surg. C. W. D'Alemberte in charge. Post-office and telegraphic address, Pensacola, Fla.

Boarding for quarantine-inspection purposes and all fumigations are done at this station from the city office. Vessels entering the port requiring inspection are boarded at anchor about 1 mile from shore. The quarantine station on Santa Rosa Island, about 7 miles down the bay, is maintained for hospitalization and detention purposes.

Vessels arriving at Pensacola consist for the most part of steamships and an occasional sailing vessel. These vessels come from all parts of the world. All rats destroyed by fumigation (using hydrocyanic-acid gas) are subjected to laboratory examination for evidence of plague.

Perth Amboy, N. J.—(Under supervision of the New York quarantine station.) Acting Asst. Surg. C. W. Naulty, jr., in charge. Post-office and telegraphic address, Perth Amboy, N. J.

In instances in which vessels arrive requiring fumigation, fumigators are sent from the New York quarantine station for the performance of this work. During the year 74 vessels requiring inspection arrived from foreign ports. Several oil refineries are being built along the shores of the Staten Island Sound adjacent to this city, and it has been officially stated that one company expects a steamer every day, another estimates 150 tankers a year, and another 8 or 10 every month. It is expected that this will considerably increase the quarantine work at this station.

The question of adequate quarantine anchorage is still a problem and will increase in importance when the new channel is completed. A House resolution was passed during the last Congress calling for a hearing before the Army Engineers' Board in New York on April 23, 1929, to discuss this matter. It is estimated that the work will cost about \$250,000, as it is planned to provide an anchorage basin that will accommodate five large tankers.

During the year the subject of combined boarding by the customs, immigration, and quarantine officers was discussed, and it was finally recommended that these three services should board from the customs launch. This will mean a saving of \$1,200 a year through the discontinuance of the quarantine service launch. However, if the volume of quarantine work increases as anticipated through the building of the oil refineries referred to previously in this report, it will probably be necessary to provide the quarantine boarding service with a service launch.

Plymouth, Mass.—Acting Asst. Surg. H. R. Hitchcock in charge. Post-office and telegraphic address, Plymouth, Mass.

Commerce arriving at this port consists entirely of vessels from Mexico laden with sisal. These vessels must remain in the stream until high tide, as the water at the wharf is too shallow to allow them to come alongside except during high tide. The quarantine risk from these vessels is very slight and the crews, which numbered 332, were found to be in good physical condition.

Portland, Me.—Acting Asst. Surg. A. F. Stuart in charge. Post-office and telegraphic address, Portland, Me.

During the fiscal year ended June 30, 1929, 114 steamers and sailing vessels were inspected at this station. These vessels carried 3,783 seamen and 72 passengers. Thirteen vessels were fumigated for the destruction of rats. No quarantinable diseases were observed during the year.

During the year two electric generators at this station have been set up and the medical officer's and attendants' quarters have been wired for electric lights. The brick detention barracks, hospital, and wharf are now in the process of wiring. This work, when completed, will greatly improve the facilities at this station.

The floating equipment is in fair condition. It is contemplated to change the steamer *H. W. Sawtelle* from steam to Diesel power, which when completed will place this unit of the floating equipment in first-class condition.

Portland, Oreg.—Asst. Surg. F. S. Fellows in charge. Post-office and telegraphic address, 429 Mayer Building, Portland, Oreg.

Portland was established as a quarantine station early in the fiscal year, and it now constitutes the headquarters for quarantine operations along the Columbia River. A quarantine anchorage was established in the Willamette River at Portland, thus enabling inspection and fumigation of vessels at both Astoria and Portland. Two fumigating crews were instructed in the use of cyanide gas, and during the year 56 vessels were fumigated with this gas and 16 with sulphur.

The opening of the station at Portland and the inauguration of cyanide fumigations there has greatly facilitated the movement of shipping on the Columbia River. Prior to this time vessels entering the Columbia River after sunset were required to await overnight for quarantine inspection the following morning at Astoria; now these vessels may steam up the river all night and go directly to Portland for the required quarantine inspection, thereby eliminating much delay and expense.

The launch *Donald Currie* was transferred from Astoria to Portland the early part of the fiscal year and used there until a truck suitable for fumigation was received in March, 1929. The *Donald Currie* was then returned to Astoria. Ships are boarded in the quarantine anchorage at Portland from a customs launch.

Port San Luis, Calif.—Acting Asst. Surg. T. S. Long in charge. Post-office and telegraphic address, San Luis Obispo, Calif.

The port of San Luis, where quarantine inspections are made, is located in the town of Avila, approximately 10 miles west of the city of San Luis Obispo, and does not have any Government buildings or other property for the purpose of carrying out quarantine treatment. During the year only three vessels arrived requiring quaran-

tine inspection; however, quite a number entered coastwise. The vessels entering this port are principally oil tankers and, as a whole, these ships are kept extremely clean and are not considered to afford important harborage for rats. No infectious or contagious disease was encountered on these ships during the fiscal year.

Port Townsend, Wash.—Surg. O. H. Cox in charge. Post-office and telegraphic address, Port Townsend, Wash. (Boarding and inspection station, Port Townsend, Wash.; hospital and disinfecting station, Diamond Point, Wash.)

The Port Townsend Quarantine Station serves all ports on the Puget Sound and its tributaries, the largest port being Seattle. All vessels subject to quarantine entering Puget Sound are boarded and inspected at Port Townsend. As most of the vessels entering this port are loaded with cargo, usually silk, from the Orient, they enter under the terms of provisional pratique and as a rule are fumigated at Seattle upon discharge of cargo. In order to avoid delay, vessels carrying large crews and 50 or more passengers are usually boarded en route, the medical officer proceeding to Victoria and completing the combined quarantine and medical immigration inspections prior to arrival at Port Townsend. In other instances the medical officer boards the vessel at Port Townsend and proceeds to Seattle, completing the inspections en route.

No quarantinable diseases were encountered during the year. However, beginning in the winter of 1928-29, vessels began to arrive at Puget Sound ports from the Orient with cases of cerebrospinal meningitis on board among the steerage, necessitating their detention at Diamond Point at the request of the local health authorities. These detentions at times taxed the station to its fullest capacity.

Providence, R. I.—Surg. H. G. Ebert in charge. Post-office and telegraphic address, Room 403, Federal Building, Providence, R. I.

The foreign commerce entering this port consists of oil tankers from Mexico and Caribbean ports, coal from Cardiff, Wales, and vicinity, cement from Antwerp, lumber from Russia, and passenger liners belonging to the Fabre Line from Mediterranean ports. There were also several small schooners bringing passengers from the Cape Verde Islands and two colliers from Mariupol on the Sea of Azof. One passenger vessel was remanded to New York because of a suspicious case of smallpox in the person of a member of the crew, as no detention facilities are available.

The quarantine risk in cargo brought to Providence in arriving vessels is not large. Freight landed here is of a character not attractive to rats and does not furnish rat harborage. During the year 77 vessels were inspected and no fumigations were performed. These vessels carried 7,947 passengers and 5,885 members of crew.

Sabine, Tex.—Surg. W. A. Korn in charge. Post-office and telegraphic address, Port Arthur, Tex.

This station serves the ports of Sabine, Port Arthur, Port Neches, Beaumont, and Orange, Tex., and Lake Charles, La. Boarding and inspection is conducted at Sabine, at which point all vessels bound for these ports pass. Temporarily, rented detention facilities are maintained at Sabine. The administrative office is located at Port Arthur, from which point active supervision of the vessels and conditions of the ports is conducted.

Cargoes, for the most part, are oil and its products, together with some grain and lumber. The majority of arriving vessels are of the tanker type and present but moderate quarantine risks. No vessels were detained on account of quarantinable disease. During the fiscal year, 279 vessels were inspected, of which 24 were fumigated; 10,054 members of crews and 372 passengers were inspected.

For many years it has been realized that the rented makeshift facilities at Sabine have not been adequate for quarantine purposes and that a suitable site should be obtained and an adequate quarantine station provided for the protection of the ports in the Lake Sabine district. Several sites have been under consideration, and one such site consisting of 11.2 acres fronting on Sabine Pass was determined to be satisfactory for this purpose and recommendations have been made for its purchase at a cost of \$25,000 from the Union Sulphur Co., of Sabine, Tex. In this purchase are included improvements consisting of 1 six-room residence, 2 garages, 1 oil-storage house and repair shop, 1 office building with fireproof vault, 1 wharf 409 feet long, and 1 small landing wharf.

San Diego, Calif.—Asst. Surg. G. T. Sprague in charge. Post-office address, Point Loma, Calif., telegraphic address, San Diego, Calif.

Although the number of vessels inspected this year was considerably less than in previous years, the total number of passengers and seamen was greatly in excess of that of other years. This is due to a change in the operations of the fishing fleet out of this port. Formerly nearly all of these vessels touched the Mexican coast and were thus made subject to quarantine inspection. At present the majority of the fishermen operate upon the high seas and do not require quarantine inspections. The increase in the number of passengers and seamen inspected shows that there has been a marked increase in the foreign shipping entering this port over previous years.

The foreign commerce entering the port is of such character as to reduce the quarantine risks to a minimum. The fishing vessels that operate along the coast of Baja, Calif., still comprise the majority of vessels inspected. Next in number are the intercoastal vessels. While much less numerous than the fishing boats, this class furnishes most of the personnel, both crew and passengers. Following the intercoastal vessels in number are the ships flying foreign flags. These are principally Scandinavian, French, and Mexican, with an occasional British ship. In addition there are a number of small cargo boats, American yachts, and Mexican patrol boats that enter here from Mexico.

During the past year the Municipal Airport at San Diego was officially designated as an airport of entry for aircraft from Mexico. During the eight months in which these inspections have been made 770 planes passed quarantine. The quarantine risks presented by these planes are extremely slight, as over 90 per cent of them touch Mexico only at Agua Caliente, about 3 miles across the border, and the passengers carried are practically all citizens of the United States who have made short visits to that point.

The boarding boat *Penguin* has been put on dry dock periodically during the year for overhauling and painting. The *Penguin* was received at this station in 1903 and has now reached the end of her usefulness. This vessel was examined by a board of survey and recommendations were made that it be removed from service and replaced

by a new vessel. Pending the securing of a replacement, this vessel is still in use, but extreme care must be observed in its operation.

San Francisco, Calif.—Surg. J. R. Ridlon in charge. Post-office and telegraphic address, Angel Island, Calif.

Administrative headquarters and detention facilities are maintained at the Angel Island station, while fumigation and boarding procedures are carried out from substations on the San Francisco water front.

There are about 40 lines maintaining regular passenger or freight service from foreign ports to San Francisco. Several other lines furnish intercoastal service via the Panama Canal. Each year there is an increase of motor ships with refrigerated holds. More than half of the lines engaged in foreign commerce have constructed new vessels during the year or have definite plans for such construction. The bulk of the passenger traffic comes from oriental, Australian, and Hawaiian ports. Vessels from the Orient and South America regularly call at ports which are reported to be infected with several of the quarantinable diseases.

Two vessels arrived during the year with patients suspected of having smallpox on board. The patients were brought to the quarantine station and all contacts on shipboard were vaccinated and observed for immune reactions. One vessel was detained 48 hours. After observation it was determined that only one patient had smallpox. He was held until recovery.

The most serious problem confronted at the San Francisco quarantine station has been the arrival of cases of epidemic cerebrospinal meningitis occurring upon trans-Pacific vessels from the Orient. This infection has been confined to steerage passengers and crews and has been most prevalent among Filipinos. The meningitis has prevailed upon shipboard along with epidemics of pneumonia, influenza, and measles. Records at the San Francisco quarantine station show that during the year 126 cases of meningitis have occurred upon 14 vessels bound for San Francisco. The average number of steerage passengers upon these vessels has been somewhat in excess of 600 per ship. These 126 cases were distributed as to nationality as follows: Filipinos, 99; Chinese, 22; Japanese, 1; white crew, 4.

Vessels with cases of cerebrospinal meningitis arriving at quarantine were treated as follows: Cultures from the nasopharynx of practically all steerage passengers and steerage attendants were made upon the day of arrival and examined in the laboratory on the following day. The sick were isolated in hospital and put under treatment. All exposed groups or contacts were placed under observation and detention at the quarantine station. In accordance with the State law this period of detention was for 14 days. During this time they were mustered twice daily for observation and the taking of temperatures. All those shown to be "carriers" by laboratory examination and those presenting symptoms of illness were kept in isolation under treatment. There were found 75 meningococcus carriers among a total of 3,592 passengers and crew examined. During the last half of the year it was necessary to detain at the quarantine station more than 2,100 steerage passengers who had been exposed to meningitis on shipboard. This procedure was in accord with amendment No. 12 to the Quarantine Regulations. Fourteen secondary cases of meningitis developed among those detained. Infection probably was introduced upon shipboard by "carriers" among steerage passengers, and under the

conditions prevailing which compelled intimate contact in crowded quarters the disease has continued to spread by direct exchange of nose and throat secretions.

The number of vessels inspected at quarantine during the year was 576, carrying more than 79,000 passengers and crew. This is an increase over the preceding year. A total of 400 vessels was fumigated during the year. The majority of these vessels was fumigated with a combination of liquid hydrocyanic-acid-cyanogen-chloride mixture in the holds and Zyklon-B in the superstructures. No rats were found after fumigation on 257 of the 400 vessels fumigated. The remaining 143 vessels yielded 2,056 dead rats after fumigation, classified by species as follows: *Rattus norvegicus*, 4; *Rattus alexandrinus*, 1,003; *Rattus rattus*, 1,036; and unidentified, 12. The dead rats were distributed as follows: In holds, 1,366; storerooms, 181; galleys, 34; crews' quarters, 42; other superstructures, 433. Thus about 66 per cent of the rats killed were found in the holds and the remainder in other parts of the vessel outside the holds. Very few rats were found in the passenger quarters. All dead rats were examined in the laboratory and found to be free from plague infection. A limited amount of trapping was done on 47 vessels with a total catch of 97 rats, as follows:

Number of vessels trapped immediately before fumigation-----	10
Number of rats caught (on 7 vessels)-----	26
Number of rats killed by subsequent fumigation (on 8 vessels)-----	123
Number of vessels trapped immediately after fumigation-----	4
Number of rats caught-----	0
Number of rats which had been killed by previous fumigation (on 4 vessels)---	59

No records of the results of previous or subsequent fumigation are available for 33 vessels on which trapping yielded 71 rats, as fumigations were done at other ports. Trapping has been carried out to a limited extent on wharves with a total catch of 142 rats. These rats were nesting among articles stored on the wharves, as the construction of local docks offer very little rat harborage. One inspector visited 1,018 vessels to observe compliance with rules concerning the use of rat guards on mooring lines. About 18 per cent of these vessels were found with one or more lines not properly guarded and the condition was corrected.

During the year two vessels were constructed at a local shipyard in a rat-proof manner under the supervision of this office. Several other lines which are building new vessels have taken steps to include in the specifications of construction the stipulation that the vessels be made rat proof.

San Pedro, Calif.—Surg. H. A. Spencer in charge. Post-office and telegraphic address, 111 West Seventh Street, San Pedro, Calif.

The administrative activities are performed in a suite of offices convenient to the water front. Ships arriving are reported by the marine lookout to the boarding officer who, when not otherwise engaged, remains in the combined quarantine and relief office from the beginning of boarding until the close of day. An effort has been made to obtain reports from the lookout sufficiently in advance to permit the boarding launch to be in the bay at the time of, or before, the vessel anchors. The inspection of vessels is made inside the breakwater, a distance of approximately 20 minutes' run with an 8-knot boat. Custom, immigration, agriculture, and quarantine activities are per-

formed on the vessel at the same time, so that when the ship arrives at the dock discharging operations may start immediately. With few exceptions, fumigation is accomplished at the dock.

Trade lanes have been established with both coasts of South America, Japan, China, Malay Archipelago, Africa, British Isles, West coast of Europe, and to a lesser extent with Mediterranean ports. From Africa come spices; from South America, coffee, grain, nuts, and fertilizer; from the Orient, vegetable oils, silk, rags, rubber, nuts, coffee, and copra; from Europe, iron, steel, glass, paints, and toys; from Central America, Mexico, and the West Indies, sugar, fruits, minerals, and vegetables. Cargo vessels comprised 641, petroleum ships 501, fishing boats 353, and yachts 43. The quarantine risks from these vessels are minimized both by the type of vessel and the time necessary in traveling from infected territory; also by fumigations performed at foreign port of departure. These factors have served greatly to reduce the number of rat-infested vessels as demonstrated on 339 petroleum vessels and 49 cargo vessels found rat free on inspection. No quarantinable diseases were found aboard any ship arriving during the fiscal year. One vessel with smallpox was diverted to another station because of lack of detention facilities at the port.

Savannah, Ga.—Acting Asst. Surg. Barton Brown in charge. Post-office and telegraphic address, Savannah, Ga.

During the fiscal year no quarantinable diseases were encountered and no vessels were detained. The number of vessels inspected show an increase of 21 over the preceding year. Approximately 49 per cent of the vessels inspected were sugar cargoes. Occasional vessels with cargoes of bananas from Honduras also entered this port; the balance of the cargoes were principally potash from Germany or Belgium and cargoes of nitrates from the west coast of South America. Practically all of the nitrate-cargo vessels were fumigated at a home port. The quarantine risk on these vessels is not very great under the present conditions. However, the quarantine risks from the occasional vessel arriving with cargoes of burlap from India is much greater by reason of their having come from plague-infected ports and by the character of their cargo. In the past few years there has been noted a great improvement in the condition of the vessels as to rat harborage and infestation.

Seattle, Wash.—Senior Surg. L. D. Fricks in charge. Post-office and telegraphic address, 124 Grand Trunk Dock, Seattle, Wash.

Seattle is the largest and most important port of entry on Puget Sound. Practically all vessels entering Puget Sound pass Port Townsend Quarantine Station and stop there for quarantine inspection, thence proceeding to Seattle for fumigation after discharge of cargo. In a number of instances certain passenger liners, instead of stopping at Port Townsend for quarantine inspection, are boarded at Victoria and are inspected en route between Victoria and Port Townsend or Victoria and Seattle; this also applies in some instances in the case of certain silk vessels which are allowed to pass Port Townsend during the night and are inspected early the following morning at Seattle. During the year, 19 such vessels were inspected at Seattle and 235 were fumigated—174 with Zyklon-B and 61 with sulphur.

The most serious problem confronted at this port during the year was the arrival of vessels from the Orient with cases of cerebrospinal meningitis among the steerage passengers. This disease has been most prevalent among Filipinos. In some instances arriving vessels with cases of meningitis aboard were inspected by the medical officer at Port Townsend and the necessary action taken by that officer; in other cases the vessel was allowed to proceed to Seattle to be handled by the medical officer in charge at that port. All cases and contacts which arrived on vessels were housed in the hospital and detention station at Diamond Point except the earlier arrivals, in which case the local health authorities undertook to house and care for cases and contacts in the available local facilities. Meningitis is not classed as a quarantinable disease, and therefore authority did not obtain for the care and treatment of these cases at the national quarantine station. Soon, however, the local facilities became overburdened, and at the request of the local health authorities and under authority of amendment No. 12 to the Quarantine Regulations, which was promulgated on December 26, 1928, to care for this and similar emergencies, the Public Health Service extended the use of the Federal facilities at Diamond Point for the isolation and care of cases and contacts. By early spring the situation began to look alarming; vessels were arriving with cases of meningitis, and between 300 and 400, sometimes more, steerage requiring detention. The facilities at Diamond Point soon became taxed to the utmost. During the period March 12, 1929, to May 28 there were 11,448 detention days at Diamond Point. During this period the actual number of cases of meningitis was 47, with 9 deaths. With the promulgation of Executive Order No. 5143, approved June 21, 1929, having for its purpose the restriction and supervision of the transportation of passengers from ports in China and the Philippines to United States ports under regulations of the Secretary of the Treasury, together with the onset of the more favorable climatic conditions of the summer season, cases of meningitis on shipboard decreased. However, occasional cases are still occurring, and it is believed that only strict enforcement of the regulations of the Secretary of the Treasury issued under authority of Executive Order No. 5143 will meet the situation.

The rat-control program in the port which has been continued in cooperation with the Seattle health department was conducted during the year under the direction of the Seattle quarantine station, four trappers being furnished by the city. The rat squad trapped 13,910 rats within the city limits, and 905 rats were found dead on vessels following fumigation, making a total of 14,815 rats known to have been killed. Five thousand three hundred sixty-two of these rats were examined at the laboratory for plague infection; no plague rat was found. During the year 7,858 rats were examined for fleas, on which 1,004 fleas were found.

Zyklon-B has been used exclusively during the fiscal year in the fumigation of vessels. This method has resulted in a saving of time and expense to both maritime commerce and the Government. The ratproofing of vessels is considered an important part of quarantine procedure, but was not utilized to the fullest extent because of the lack of personnel.

Arrangements have been completed for the inauguration of a flea survey at this port. The investigation is proceeding satisfactorily,

but has not reached a conclusive point where a report would be warranted.

The greatest need at the port is a completely equipped quarantine station. A site for this purpose has been made available in the outer harbor by the dredging and excavating activities recently completed by the United States Army Engineers. The entire 60-acre reclaimed tract comprising the Government reservation has not been entirely filled, but it is believed that contemplated dredging in the bay will provide the required amount of material.

South Bend, Wash.—Acting Asst. Surg. Francis . WAnderson in charge. Post office and telegraphic address, South Bend, Wash.

There was a slight increase in the quarantine work at this station during the fiscal year 1929. Six vessels arrived from foreign ports and four entered from British Columbia; the latter are not required to be inspected under the regulations. One vessel was fumigated. It is expected that there will be an increase in the quarantine work at this port in the future, due to the construction of a pulp mill on this harbor.

Tampa, Fla.—Surg. Friench Simpson in charge. Post office and telegraphic address, Tampa, Fla.

The Tampa Bay quarantine station is located on Mullet Key, 28 miles southwest of Tampa, at the entrance to Tampa Bay. It serves the ports of Tampa, Port Tampa, and St. Petersburg. Arriving vessels are inspected at anchor off the quarantine station and practically all are fumigated at quarantine; many arrive in ballast for bottom cargoes and are fumigated before entry; a few vessels loaded with cargo enter and discharge prior to fumigation. During the fiscal year 86 vessels, with a total tonnage of 205,905 net tons were fumigated. The number of vessels fumigated represents an increase of 23 over the previous year. A total of 402 rats were found following fumigation. Of the 86 vessels fumigated, 9 contained cargoes of rat-attractive foodstuffs, 77 were without rat-attractive cargoes.

Because of the isolation of the quarantine station on Mullet Key and its distance from the ports it serves, quarantine activities function with difficulty. In order to overcome these objections and meet the demands of the enlarged and expanding commerce the transfer of the station to a site more conveniently situated should be effected as soon as practicable. A new site of approximately 30 acres on the mainland at Gadsden's Point has been strongly urged by local interests. This site is conveniently situated and is available to the Government without cost.

MEXICAN BORDER STATION

TABLE 3.—Summary of quarantine transactions on the Mexican border for the fiscal year ended June 30, 1929

Station	Number in- jected from in- terior Mex- ico	Number of local passen- gers in- spected	Total number of pas- sengers inspected	Total number of persons disin- fested	Total number of persons passed without treat- ment	Total number of persons vacci- nated	Total number of sick held for obser- vation	Total number of sick refused admis- sion	Total pieces of bag- gage disin- fected
Brownsville, Tex....	5,908	982,743	988,651	3,303	979,216	6,132	0	0	5
Calixico, Calif.....	947	2,484	3,431	0	42	583	0	113	0
Columbus, N. Mex....	737	10,660	11,397	0	11,344	103	0	0	0
Douglas, Ariz.....	1,174	5,234	6,408	0	5,228	1,180	0	0	149
Del Rio, Tex.....	2,944	128,088	131,032	968	128,759	1,205	0	0	3,900
Eagle Pass, Tex....	10,287	934,802	945,089	9,905	935,184	3,524	0	143	10,821
El Paso, Tex.....	20,645	2,300,638	2,321,283	16,244	2,292,114	12,908	0	17	3,577
Hidalgo, Tex.....	4,088	362,550	366,638	53	363,055	3,323	0	0	50
Laredo, Tex.....	38,230	1,919,852	1,958,082	12,005	1,920,848	37,234	121	0	15,043
Minerva, Tex.....	0	2,951	2,951	0	2,504	447	0	4	0
Naco, Ariz.....	718	3,872	4,590	0	3,857	679	0	54	0
Nogales, Ariz.....	6,204	14,625	20,829	4,193	13,047	3,140	314	135	1,742
Presidio, Tex.....	1,483	16,138	17,621	126	14,642	3,005	6	42	693
Rio Grande, Tex....	1,448	23,071	24,519	25	22,590	1,954	0	0	1,235
Roma, Tex.....	13,401	39,637	53,038	607	46,873	5,568	0	0	1,393
San Ysidro, Calif....	817	4,144	4,961	0	4,553	327	18	58	0
Sasabe, Ariz.....	0	837	837	0	584	252	0	1	0
Thayer, Tex.....	336	114,812	115,148	52	113,335	1,707	10	4	190
Zapata, Tex.....	0	11,312	11,312	0	10,069	1,243	0	4	0
Total.....	109,367	6,878,450	6,987,817	47,521	6,868,049	84,504	469	724	38,649

QUARANTINE OPERATIONS ALONG THE MEXICAN BORDER

In recent years there has been noted an improvement in the general sanitary condition of aliens applying for admission along the Mexican border. An intensive delousing and compulsory vaccination campaign has been recently carried out in the City of Mexico, and the general sanitary measures inaugurated there are being extended to the remote districts of the Republic as rapidly as possible. The public schools are being utilized to disseminate knowledge on health matters, and in those isolated rural districts where public health officers are not available for performing vaccinations the teachers receive instructions in the technique of vaccination, so that they may perform this operation if necessary. As typhus fever and smallpox are the diseases most likely to be encountered at present at these ports, the measures in force have been directed principally against their introduction. During the year 84,504 vaccinations have been performed and 47,521 persons have been disinfested. Notwithstanding disturbed conditions due to the revolution that existed in Mexico during several months of the year, no known epidemic of either of these diseases occurred. During the revolution the entrants were largely refugees of the better class coming into the United States from the interior to save their lives and property, and their sanitary status was very good.

Mexico has also developed considerable tourist traffic, and it is believed that in the next few years this will increase even more. The question of tourist traffic constitutes an important quarantine problem and quarantine officers must exercise every precaution to guard against the introduction of smallpox through this source.

During the fiscal year the old bridge and ferry formerly conducted by the Missouri Pacific Railway at Brownsville have been discontinued and the service moved into new quarters at the foot of the new international bridge, where adequate facilities for delousing and disinfection of clothing have been provided. All traffic now passes over this new bridge. A new international bridge across the Rio Grande at Thayer was also completed during the year and a new quarantine station was opened there on September 1, 1928. Since that date 115,148 persons have crossed the bridge from Mexico into the United States. The majority of these, however, have been Americans residing in that locality who enter Mexico for purposes of diversion and remain there only a few hours. At several other points along the Rio Grande new bridges were opened to traffic during the year. For this reason it became necessary to open Zapata as an official port of entry on April 1, 1929. Quarantine operations at the newly opened international bridge over the Rio Grande near Ysleta have been carried on under the direct supervision of the medical officer at El Paso, and during the period June 1 to 30, 1929, during which period the bridge was opened to traffic, a total of 269 persons were inspected and 114 vaccinated.

During the year the Kansas City, Orient & Mexico Railroad was completed from Chihuahua City, Mexico, to Ojinaga, Mexico, and passenger trains were run regularly between these two cities, thereby bringing more travelers from the interior of Mexico through the port of Presidio. This railroad is now building from Alpine, Tex., to Presidio, Tex., and it will cross the Rio Grande River three miles from the latter place. This bridge, it is reported, will be constructed so as to accommodate trains, vehicles, and pedestrians, and it is quite probable that it will be necessary to provide adequate facilities at the American bridgehead to care for the traffic at this point. With the completion of this railroad there will be a direct through service from Kansas City to Chihuahua City, Mexico, where this line joins the National Railroads of Mexico, which will probably cause a great increase in traffic through the port of Presidio from the interior of both countries.

The designation of airports of entry at several points along the border has added considerably to the quarantine work. The quarantine risks from this class of travel has been rather slight, as there is practically no turnover in the crews and the passengers are of the better class. However, the fact that the journeys consume so much less time than the incubation period for all of the known quarantinable or communicable diseases increases the possibility of their spread and requires constant vigilance on the part of quarantine officers.

Clandestine crossing of the border continues; but, probably due to the more severe penalty inflicted for illegal entry, clandestine crossing appears to be decreasing somewhat. The border patrol force continues to patrol the river day and night, but the force is small compared to the territory to be covered, and it is impossible to prevent some illegal entries.

TRANSACTIONS AT INSULAR QUARANTINE STATIONS

TABLE 4.—*Summary of transactions at insular stations for fiscal year ended June 30, 1929*

Station	Vessels inspected	Vessels fumigated		Passengers inspected	Crews inspected	Bills of health and port sanitary statements issued
		Cyanide	Sulphur			
Hawaii:						
Ahukini.....	0	0	0	0	0	23
Hilo.....	11	1	0	13	351	177
Honolulu.....	188	26	0	46, 289	24, 731	722
Kahului.....	1	0	0	0	38	117
Kihei.....	0	0	0	0	0	0
Koloa.....	4	0	0	0	138	52
Lahaina.....	0	0	0	0	0	41
Mahukona.....	1	0	0	0	32	18
Makaweli.....	0	0	0	0	0	0
Total.....	205	27	0	46, 302	25, 290	1, 150
Philippines:						
Cavite.....	41	0	0	29	5, 432	8
Cebu.....	125	31	130	171	7, 479	338
Davao.....	25	0	0	581	2, 449	97
Iloilo.....	59	0	129	205	3, 123	228
Jolo.....	45	0	0	786	884	41
Legaspi.....	1	0	0	0	59	13
Manila.....	1, 048	106	202	70, 206	95, 122	1, 218
Olongapo.....	0	0	0	0	0	0
Zamboanga.....	35	0	22	853	2, 687	113
Total.....	1, 379	137	483	72, 831	117, 235	2, 056
Porto Rico:						
Aguadilla.....	3	0	0	0	103	71
Arecibo.....	1	0	0	0	28	30
Arroyo.....	0	0	0	0	0	38
Central Aguirre.....	1	0	0	0	6	15
Fajardo.....	14	0	0	0	65	211
Guanica.....	176	0	1	803	10, 955	18
Humacao.....	17	0	0	0	282	50
Mayaguez.....	31	0	0	0	368	70
Ponce.....	74	3	0	212	2, 082	133
San Juan.....	614	36	0	15, 056	29, 888	791
Total.....	931	39	1	16, 071	43, 777	1, 427
Virgin Islands:						
Christiansted.....	6	0	0	9	33	106
Frederiksted.....	42	0	0	1, 690	2, 672	80
St. Thomas.....	369	15	5	1, 927	14, 175	631
Total.....	417	15	5	3, 626	16, 880	817
Alaska:						
Ketchikan.....	5	0	0	117	0	0
Total, all stations.....	2, 937	218	489	138, 947	203, 182	5, 450

REPORTS FROM INSULAR QUARANTINE STATIONS

OPERATIONS OF THE SERVICE IN HAWAII

Senior Surg. S. B. Grubbs relieved Surg. Hugh de Valin as chief quarantine officer near the close of the fiscal year. Post-office address, 202 Federal Building, Honolulu, Hawaii, Telegraphic address, Honolulu.

Only one station equipped to carry on all of the quarantine activities is maintained in the Territory of Hawaii. It is situated on Mauiola Island in the harbor of Honolulu. In addition, vessels are inspected at the following ports on other islands of the group: Hilo and Mahu-

kona on the Island of Hawaii; Kahului and Lahaina, on Maui; Ahukini and Koloa, on Kauai.

No case of quarantinable disease was found on vessels entering Hawaiian Island ports during the fiscal year. Cerebrospinal meningitis occurred on certain ships that arrived during the last part of the year, and these cases and contacts were detained at the quarantine station by the Territorial board of health, the Territory having no facilities for their isolation. A total of 1,015 persons were so detained. They were all in the steerage of vessels from the Orient, and were mostly Filipino laborers destined for Honolulu under the care of the Hawaiian Sugar Planters' Association.

The first ship from which meningitis contacts were taken to Quarantine Island was the Steamship *President Pierce*, which arrived at this port March 14 with 15 cases among the Filipino steerage passengers. One case of meningitis had been put ashore at Yokohama, and there had been seven deaths en route, reported as pneumonia, but in all probability meningitis. Three hundred and ninety-seven contacts were quarantined on the station, among whom 32 cases of meningitis subsequently developed. All cases were cared for in the Queen's Hospital, 16 terminating fatally.

The next two vessels to arrive from Manila via China and Japan, the *President Taft* on March 28 and the *President Jefferson* on April 11, had had no meningitis during the voyage. However, one case was reported afterwards on the island of Hawaii among the Filipinos from the *President Taft*, and two cases developed among the Filipinos from the *President Jefferson* while they were still at the Hawaiian Sugar Planters' barracks awaiting distribution to the plantations.

On April 25 the Steamship *President Lincoln* arrived with 13 Filipinos and one Chinese sick with meningitis. These were sent to the Queen's Hospital. There had been 3 deaths from meningitis en route. The entire Honolulu steerage, numbering 293 persons, and 20 steerage passengers for San Francisco who had temperatures were taken to the quarantine station. Two cases developed among the detained Honolulu Filipinos.

There was no meningitis on the steamship *President Madison* which arrived from the Orient May 9. The next vessel, the steamship *President Jackson* arriving May 23, had 13 cases of meningitis and 1 meningitis carrier. Nine deaths from meningitis had occurred en route to Honolulu, and there was one more death after the ship had been tied up at the dock; 279 Filipino and 26 Chinese steerage passengers were detained at the quarantine station. Nineteen cases of meningitis, all occurring among those detained, were cared for in the station hospital. The total number of cases from the *President Jackson* was 26, with 5 deaths. The period of detention for meningitis contacts from the first two vessels had been 10 days from the date of last possible exposure, but this was increased by the board of health to 14 days for contacts from the *President Jackson*.

No further cases of meningitis occurred on vessels arriving from the Orient. Near the end of the year, one case of meningitis, and one suspected case, arrived from San Francisco in the troop class of United States Army transports.

All the buildings at the quarantine station at Honolulu are old, some of them having been used for quarantine purposes in the days of the monarchy, prior to annexation of Hawaii to the United States.

They are wooden structures and are so badly damaged by termites that little more than a shell remains of many of them. Minor repairs, such as replacement of steps, timbers, and floors, have to be made constantly, for the sake of safety, but no extensive alterations or repairs have been undertaken. The destruction of practically all of the buildings now standing, and replacement with such units as will be needed, constructed preferably of hollow tile, concrete, or other termite-resisting material, will be necessary in the near future.

With a single exception, all vessels fumigated were so treated at the request of the owners for the destruction of vermin and were mostly small craft of the Army and Navy stationed here. As most of the vessels entering this port are en route to other ports, their usual stay being less than 24 hours, and as they are in cargo, they are not fumigated. During the fiscal year 1929, 205 vessels were inspected at quarantine and inspection stations on these islands, 46,302 passengers and 25,290 crew were carried on these vessels and were inspected.

OPERATIONS OF THE SERVICE IN THE PHILIPPINE ISLANDS

Surg. R. W. Hart, Chief Quarantine Officer. Post-office address, P. O. box 424, Manila, P. I.; office, customhouse, Manila; telegraphic address, Quarantine, Manila.

Quarantine inspection is conducted in the Philippine Islands by the service at seven ports of entry and at two naval stations. Officers serving full time are stationed at Manila, Cebu, and Iloilo. Part-time local physicians act as quarantine officers at Davao, Legaspi, Jolo, and Zamboanga. At the naval stations, Cavite and Olongapo, the quarantine work is performed by medical officers of the United States Navy, who are detailed for such service by the admiral commanding. There are on duty in the Philippine Islands 5 commissioned officers, 6 acting assistant surgeons, 1 pharmacist, and 70 employees. The detention and disinfection work are performed at two quarantine stations—one at Mariveles for the northern part of the archipelago and one at Cebu for the southern section of the islands.

From a quarantine viewpoint, the Philippine Islands present an unusual problem. The proximity of the islands to the world's greatest foci of three of the quarantinable diseases—cholera, smallpox, and plague—and the fact that rapidly traveling passenger vessels have brought those infected places much nearer the Philippines, has increased the quarantine responsibility. While during the year the oriental ports nearest the Philippines have not suffered from severe epidemics, with the exception of smallpox at Hong Kong, cholera at Saigon, and meningitis at Shanghai, the constant occurrence of cases of quarantinable disease at places in the Orient from which large numbers of steerage passengers arrived in the Philippines, frequently less than two days from the foci of infection, demanded the utmost vigilance. This condition is one fraught with considerable menace and constitutes a much greater problem than that offered by vessels which have had from 5 to 10 days elapse since leaving the last infected port. The number of vessels entering Philippine ports from abroad has been increasing considerably in recent years. During the fiscal year 1929, in carrying out the preventive measures it was not deemed necessary to hold vessels or their personnel in quar-

antine except that in a number of cases passengers were held on board arriving vessels until laboratory reports were available from cultures taken to determine whether cholera or meningococcus carriers existed among them.

The quarantine functions in the Philippines during the past year assumed unusual proportions due to the large number of steerage passengers leaving the Philippines for the United States and the Territory of Hawaii. One thousand three hundred and seventy-nine vessels were inspected, of which 620 were fumigated. A total of 72,831 passengers and 117,235 crew were inspected. All steerage passengers embarking for United States ports were vaccinated against smallpox, and stool specimens were taken for cholera examination. During the latter half of the year the "multiple pressure method" of vaccination was adopted and gave excellent results. The percentage of "takes" was higher than that secured by the "scratch method," immune reactions showed up distinctly, and the percentage of secondary infections was practically nil.

After the outbreak of epidemic meningitis in Shanghai and the occurrence of meningitis on vessels en route to the United States, the chief quarantine officer made nasopharyngeal cultures on a number of departing Filipino steerage passengers to determine whether or not meningococcus carriers existed among those embarking at Manila. On March 15, 1929, certain additional restrictions for the steerage class were put into effect, upon instructions from the bureau, which included daily observation with temperature readings for a considerable period of time before sailing, in addition to the examination of nasopharyngeal cultures. During the year 9,179 examinations were made for meningococcus on outgoing steerage passengers and crews of vessels proceeding to the United States. Of this number 78 were found to be meningococcus carriers, although a considerable number of them were nonagglutinating strains, though morphologically and culturally meningococcus. A few cases of meningococcus meningitis occurred in the city of Manila, or nearby, the first being on March 30, 1929. Several of these cases were traceable to the water front, and it is not unlikely that they became infected from contact with carriers while working as stevedores on board arriving vessels.

INTERISLAND QUARANTINE

A measure of supervision was maintained over vessels plying between interisland ports. All of them were fumigated once in each six months, at which time it was demanded that they be thoroughly cleaned and that all members of the crews be revaccinated, if they had not been vaccinated within the past year. Owing to the absence of quarantinable diseases in the islands, no interisland quarantine detention was placed in effect between any of the ports of entry in the Philippine Islands during 1929.

FUMIGATION OF VESSELS

Facilities for fumigating vessels exist at five ports of entry and the two quarantine detention stations. On account of the fact that Philippine ports are usually ports of call and that vessels remain in port but a short period and are nearly always loaded with cargo, it is often not practicable to fumigate at a Philippine port. During

the fiscal year 620 vessels were fumigated, from which were recovered 1,869 rats. Sulphur was used almost exclusively for interisland vessels and Zyklon-B for foreign ships with cargo. Periodical fumigations were performed in the case of all vessels making one of the Philippine ports as a regular port of call. During the increase of plague in Indo-China all vessels laden with rice or other foodstuffs as cargo were fumigated immediately upon arrival.

Aside from the destruction of rats on board vessels by means of fumigation, a decided effort was made at all ports of entry of the Philippine Islands during the year to lessen the rat population in those areas adjoining piers and quays. As a measure tending to reduce the rat population and consequently the danger of the introduction and dissemination of plague, a large number of rat-harboring structures were removed and rat proofing of a number of others on the various water fronts was carried out. The local public-health authorities cooperated in a commendable manner and issued instructions for a continuous antirrat campaign. Orders were issued that all new construction and repair work on buildings in those zones near the various water fronts be made as nearly rat proof as possible. In the city of Manila, and to a lesser degree in the other port cities of the islands, rat trapping and poisoning were carried out actively during almost the entire year. In Manila a total of 42,255 rats were recovered and examined. No plague infection was found in any of the rats examined at any of the several ports of entry.

BUILDINGS AND FLOATING EQUIPMENT

At the quarantine stations at Mariveles and Cebu the buildings were kept in as good repair as possible with the appropriations available. No new construction of any kind was authorized or done during the year. At the Mariveles Quarantine Station it is contemplated in the near future, if funds are appropriated for the purpose, to erect a combination cabin passenger detention and hospital building. At Cebu no new construction is contemplated except that the office building on the water front will be torn down in view of the new quay being constructed where the office building is located. As there is no room in the customhouse for quarantine office, it will probably be necessary to construct a small office building to replace the building now used.

With one exception the launches of the service were kept in commission during the entire year. One additional steam launch was acquired by transfer from the Shipping Board which, in view of the fact that the engine of the launch *Viola* is so constantly out of repair, aided greatly to the efficiency of the quarantine work, particularly when incoming and outgoing quarantine work and fumigations were being performed simultaneously. Appropriations were available for making the necessary repairs for all the launches of the service. This expense is borne by the Philippine government, which is also true in the case of the necessary repairs to and new construction of buildings.

OPERATIONS OF THE SERVICE IN PORTO RICO

Surg. L. E. Hooper, chief quarantine officer. Post-office and telegraphic address, San Juan, P. R.

Quarantine-inspection facilities are maintained at all ports of entry. San Juan is the principal port and headquarters of the quarantine service for the island. The Miraflores quarantine station in San Juan Harbor is completely equipped for boarding, fumigation, and detention. Fumigations are done with Zyklon-B. There is also considerable shipping activity at Ponce and adequate boarding and fumigation facilities are maintained at that port. In addition boarding inspection is provided at the subports of Aguadilla, Arecibo, Arroyo, Central Aguirre, Fajardo, Guanica, Humacao, and Mayaguez.

A considerable number of foreign vessels enter the ports of this island. Many come from northern Europe. The Spanish Trans-Atlantic Line passenger ships arrive twice each month from Mediterranean ports and the Canary Islands. These vessels are carefully handled to prevent the possible introduction of plague. The cargoes are usually vegetables in crates, and these are subjected to fumigation in covered lighters before they are permitted to come to the dock. Commerce with United States ports is very active. The New York and Porto Rico Line, Bull Insular Line, and the Red "D" Line maintain a regular service to New York. They carry passengers and general cargo. The Lykes Line boats from Galveston also call here every two weeks. Many of these vessels call en route at ports in Cuba, Haiti, Dominican Republic, and Venezuela. In addition, the Pan American Airways, Inc., maintain a regular passenger and mail airplane service arriving at this port from Miami three times a week. They usually call at Habana, Santiago, Port-au-Prince, and Santo Domingo. No quarantinable diseases were detected during the year and no special events of quarantine importance occurred.

The administrative activities of the quarantine and relief station are combined and are conveniently located at the old naval station. This office is conveniently located for all of the shipping interests. Much work on the grounds and buildings at the Miraflores quarantine station has been done during this fiscal year. On September 13, 1928, a hurricane of great intensity swept the island of Porto Rico, causing much damage. At the quarantine station several roofs were blown off and about 100 large trees uprooted. The detention barracks suffered especially, the roof of almost the entire corridor being destroyed. This damage has now been repaired, the work being done by the station force.

The floating equipment consists of three launches, two at San Juan and one at Ponce. They have been kept in repair throughout the year by the station personnel.

The rat-flea survey begun in February, 1926, has been continued throughout the year. This work is being done in the laboratory of the department of health of Porto Rico by the Chief of the Bureau of Plague Prevention with the cooperation and assistance of the United States Public Health Service. The results are shown in the accompanying table.

TABLE 5.—Summary of a rat-flea survey from July 1, 1928, to June 30, 1929, at San Juan, P. R.

	July	August	September	October	November	December	January	February	March	April	May	June	Total
Average number of traps set daily.....	257	257	155	160	199	199	182	217	219	243	230	232	212.5
<i>Rats</i>													
<i>R. norvegicus</i> :													
Male.....	8	12	7	7	4	5	6	3	2	2	3	2	61
Female.....	13	15	12	6	9	4	10	5	1	1	1	1	78
<i>R. alexandrinus</i> :													
Male.....	3	3	2	1	3	1	4	3	2	1	3	2	35
Female.....	3	2	2	2	7	4	4	4	3	2	3	1	27
<i>R. rattus</i> :													
Male.....	2	7	1		1	1	1		4	7	1		25
Female.....	5	3	2	1	3			1	2	5		1	23
Total.....	31	42	26	17	27	15	25	16	14	18	11	7	249
<i>Fleas</i>													
<i>X. cheopis</i> :													
Male.....	92	168	66	15	107	52	30	152	42	72	125	32	953
Female.....	63	141	65	4	85	42	29	99	40	181	107	12	808
<i>X. canis</i> :													
Male.....	1								1			1	3
Female.....													
<i>C. gallinae</i> :													
Male.....					3		1					1	5
Female.....	19				9		2			7	5	2	34
<i>Pulex</i> :													
Male.....								1					1
Female.....					1						1		2
Total.....	165	309	131	19	205	94	62	252	83	260	238	48	1,866
<i>Meteorology</i>													
Mean temperature.....	80.1	80.2	80.1	79.9	79.0	76.4	70.0	74.9	75.2	76.2	76.6	79.0	-----
Mean humidity.....	83.5	80.65	79.45	76.78	78.0	77.4	75.5	73.9	75.4	68.5	77.1	77.3	-----
Precipitation.....	8.54	10.34	13.68	2.37	8.21	4.65	3.60	1.30	2.47	1.34	7.97	5.56	-----
Mean barometer.....	30.52	30.00	29.953	29.955	29.948	30.1	30.068	30.056	30.06	30.049	30.056	30.037	-----

¹ *Ctenocephilus canis* or *felis*.² *Pulex irritans*.

OPERATIONS OF THE SERVICE IN THE VIRGIN ISLANDS

Passed Asst. Surg. E. H. Carnes, chief quarantine officer. Post office and telegraphic address, St. Thomas, Virgin Islands.

The office headquarters are located in the business district of St. Thomas. The detention station is located on East Point at the harbor entrance, a distance of about 1 mile from the town of St. Thomas. While this is part of the mainland, the detention station may be reached only by water, as no road has been built to the station. At the neighboring island of St. Croix boarding is done at the ports of Frederiksted and Christiansted by medical officers of the Navy on duty in these towns.

Situated on or near the regular steamship lanes between the Panama Canal and European ports, St. Thomas with an excellent harbor furnishes an important refueling depot, and it is for the purpose of taking bunkers that most ships enter the port. During the winter season a number of large passenger tourist ships touch at St. Thomas as one of their itinerary ports on winter cruises to the West Indies. These ships are in port only a few hours as a rule. From time to time warships, both foreign and United States, enter the port. Quarantine

inspection on these vessels as a matter of courtesy is minimized, provided no quarantinable diseases have occurred on board. During the winter months pleasure yachts are frequent visitors. Sailing vessels in the interisland trade enter port during the entire year.

No quarantinable diseases have been encountered during the past year. Ships from the east coast of Brazil are subjected to close inspection and the regulations to prevent the introduction of yellow fever are strictly enforced. The presence of yellow fever in certain ports of Brazil is a potential source of danger to the Virgin Islands, as ships from these ports put into St. Thomas for bunkers, where the *Aedes* mosquito index is high. Ships from plague-infected ports of South America constitute a large number of the ships entering, and strict surveillance of these ships while in port is maintained to see that all the regulations relative to the prevention of the introduction of plague are complied with. Those ships calling at this port for bunkers and remaining only a few hours are usually loaded with cargo and are not fumigated; however, these are required to fend off 4 feet from the dock, apply standard rat guards on all lines, raise or light and guard gangways at night; and, in the case of ships from badly infected ports, are not allowed alongside the wharves after nightfall. During the past year Zyklon-B has been used as a fumigant, replacing sulphur fumigation formerly in use at this station. A total of 369 ships entered quarantine at St. Thomas during the year, with total crews of 14,175 and 1,927 passengers. At the subports of Frederiksted and Christiansted 48 ships received quarantine inspection. A total of 612 bills of health and 205 port sanitary statements were issued at St. Thomas during the year; 186 such documents were issued at the subports.

A rat and rat-flea survey of the port of St. Thomas has recently been inaugurated by the Public Health Service. Early findings indicate an overwhelming predominance of rats of the *alexandrinus* species, with a high *Xenopsylla cheopis* infestation. The average flea count per rat to date is seven. *Xenopsylla cheopis* constitutes approximately 97 per cent of the fleas found. No Norway rats have been trapped or observed. Absence of these burrowing rats may be due to the activity of their natural enemy, the mongoose, which overruns the island.

The detention station is held in readiness for use at any time. The equipment is sufficient to care for 50 people at one time and is modern and efficient, a large amount of new property and equipment having been furnished and installed there a year or two ago.

Cordial and cooperative relations have been maintained with the various departments of the Navy, the civil government, and sanitation service. While the boarding launch was undergoing extensive repairs a motor dory for boarding duty was furnished through the courtesy of the commandant of the naval station. The Public Health Service cooperates with the local sanitation service as far as possible in the elimination of mosquito breeding and in other matters bearing on public health.

TRANSACTIONS AT FOREIGN PORTS

TABLE 6.—*Summary of transactions at foreign ports*

Station	Vessels in- spected	Fumiga- tion of vessels super- vised	Passengers and crews inspected		Bills of health counter- signed
			Passengers	Crews	
Amoy, China.....	50	0	16,542	5,649	97
Guantanamo Bay, Cuba.....	13	0	0	0	127
Guayaquil, Ecuador.....	223	0	1,756	7,522	73
Habana, Cuba.....	1,904	115	148,285	173,089	1,904
Hong Kong, China.....	412	4	64,625	14,412	529
Progreso, Mexico.....	204	1	708	13,434	204
Puerto Mexico, Mexico.....	0	5	0	0	75
Shanghai, China.....	639	160	0	81,633	639
Tampico, Mexico.....	625	43	674	24,613	651
Vera Cruz, Mexico.....	328	39	8,299	20,668	328
Total.....	4,398	367	240,889	341,020	4,627
<i>European ports</i>					
Bergen, Norway.....	0	0	0	0	55
Antwerp, Belgium.....	102	66	6,075	0	953
Belfast, Ireland.....	0	0	2,146	0	76
Bremen, Germany.....	0	120	27,319	0	359
Cobh, Irish Free State.....	0	0	24,538	0	200
Copenhagen, Denmark.....	0	0	4,535	0	223
Danzig, Free City.....	197	0	32,972	0	35
Dublin, Ireland.....	0	0	0	0	48
Glasgow, Scotland.....	0	0	15,857	0	350
Goteborg, Sweden.....	45	0	18,191	0	140
Hamburg, Germany.....	243	167	40,361	0	937
Liverpool, England.....	0	78	28,901	0	685
London, England.....	21	119	2,776	0	739
Londonderry, Ireland.....	0	0	4,688	0	26
Naples, Italy.....	203	16	42,951	12,699	311
Oslo, Norway.....	0	0	7,610	0	139
Palermo, Italy.....	15	2	2,433	0	125
Patras, Greece.....	39	0	2,945	7,168	39
Piraeus, Greece.....	77	0	4,750	4,868	88
Rotterdam, Holland.....	61	55	6,958	0	714
Southampton, England.....	0	0	27,232	1,007	457
Total.....	1,003	623	303,238	25,742	6,699
Total, all stations.....	5,401	990	544,127	366,762	11,326

REPORTS FROM FOREIGN PORTS

AMOY, CHINA

Acting Asst. Surg. E. J. Strick in charge. Post office and telegraphic address, care American consulate, Amoy, China.

Health conditions in Amoy have improved somewhat during the last few years. While cases of smallpox, plague, and cholera have been reported, the number of cases was not nearly so large as in former years. Sporadic cases of meningococcus (cerebrospinal) meningitis have been reported from time to time. The main passenger traffic is between Amoy and Manila. All passengers are inspected immediately before sailing and are required to show immunity to smallpox before being allowed to embark.

A movement is on foot to establish a large municipal hospital in Amoy. Government officials contributed a large tract of land for this purpose, and it is proposed to include in this building a separate contagious-disease hospital.

During the fiscal year 1929, 50 vessels were inspected. The crew on these vessels totaled 5,649 and 16,542 passengers were carried. Ninety-seven bills of health were countersigned.

GUANTANAMO BAY, CUBA

Acting Asst. Surg. E. E. Woodland in charge. Post-office and telegraphic address, care United States naval station, Guantanamo Bay, Cuba.

At the request of the Navy Department a medical officer attached to the naval station at Guantanamo Bay, Cuba, is appointed as an acting assistant surgeon in the United States Public Health Service, to act as quarantine officer for the purpose of signing bills of health for vessels departing from the naval station at that place, as no American consul is stationed there. This officer acts in the capacity of quarantine officer without additional compensation, as the port of Guantanamo Bay is a naval port only. During the past fiscal year 13 vessels were inspected and 127 bills of health were issued.

GUAYAQUIL, ECUADOR

Acting Asst. Surg. Jose D. Moral, acting as medical officer of the Public Health Service in charge during the absence of Acting Asst. Surg. Carlos V. Coello, who has been appointed governor of the Province of Guayas. Post-office and telegraphic address, care American consulate, Guayaquil, Ecuador.

During the calendar year 1928, 73 cases of plague occurred, with 27 deaths. Measures carried out by the local health authorities have been enforced as in previous years. Isolation, deratization, and vaccination have been practiced intensively. A total of 203,972 rats have been trapped and the fleas taken therefrom have been classified. During the year 216 cases of smallpox occurred, with 7 deaths. All northbound passengers are required to submit to vaccination or show recent successful vaccination scars. A total of 32,301 vaccinations have been performed.

During the fiscal year 223 vessels bound for the canal or ports in the United States were inspected; 1,756 persons were inspected, together with 7,522 members of crew.

HABANA, CUBA

Acting Asst. Surg. Richard Wilson in charge. Post-office address, post-office box 629, Habana, Cuba. Telegraphic address, Machina, Habana, Cuba.

The work of this office in brief is as follows: (1) To countersign bills of health issued by the consul general of the United States to vessels going to ports in the United States and its dependencies, either direct or via foreign ports; these bills of health are delivered to the vessel at the last moment after all the requirements have been complied with; (2) to report the sanitary condition of the city and port and, if possible, of the surrounding country; (3) to supervise the fumigation of vessels bound for United States ports when necessary; (4) to inspect vessels, cargoes, crews, and passengers bound for United States ports when necessary; (5) to examine Americans who are sick enough to be sent to a hospital and to report to the consul general, recommending appropriate action to be taken.

The vessels fumigated in this port are divided into three classes: (1) Vessels fumigated by the service. This includes vessels going direct to the United States or its dependencies that are fumigated to comply with the quarantine regulations. (2) Vessels fumigated by

the Cuban quarantine under the supervision of the service. This includes vessels that require fumigation by the Cuban quarantine regulations and intend going to the United States, usually via Cuban ports. (3) Vessels recommended for fumigation at a United States port, either on arrival or when empty, according to circumstances. This includes vessels in transit with cargo or passengers on board, for which fumigation at Habana is not advisable. Seven vessels were fumigated under the first class and 108 were fumigated under the second class by the Cuban authorities, with service supervision for purposes of granting an indorsement of the Cuban certificate.

During the past fiscal year 1,904 bills of health were issued at this port, and a total of 173,089 crew and 148,285 passengers were inspected.

HONG KONG, CHINA

Asst. Surg. E. R. Pelikan in charge. Post-office and telegraphic address, care American consulate, Hong Kong, China.

Particular attention has been given throughout the year to the inspection of steerage passengers and crew embarking for the United States and its dependencies. During this period 64,625 passengers and 14,412 crew were inspected. All steerage passengers are required to present a certificate of vaccination showing a recent "take" or an "immune reaction" before purchasing steamship tickets. During the year 13,685 steerage passengers were vaccinated. The service representative at Hong Kong supervised the fumigation of four vessels and made appropriate indorsements on the fumigation certificate to indicate that the fumigation has been performed in accordance with service requirements.

Smallpox, always endemic at Hong Kong, became epidemic from November, 1928, to June, 1929. During the fiscal year 1,320 cases, with 1,033 deaths, were reported. During the epidemic 1,245 cases, with 982 deaths, were reported. At the beginning of the epidemic orders were issued to all shipping companies requiring that all passengers and crews on ships calling at Hong Kong and bound for the United States and Philippine Islands must be vaccinated against smallpox or present a valid vaccination certificate issued within 12 months. During the period mentioned 5,263 cabin passengers, 13,685 steerage, and 1,253 crew were vaccinated either by local physicians or by ships' surgeons. The order rescinding this requirement for all cabin passengers was issued on June 24, 1929.

Meningococcus (cerebrospinal) meningitis was not present in epidemic form at Hong Kong during the fiscal year; 25 cases, with 20 deaths, were reported. It was, however, present in the Canton district, a port about eight hours' run by steamer from Hong Kong. As most of the steerage passengers for the United States and Manila come from this district and districts farther inland, they have been carefully inspected before embarkation at Hong Kong. Nose and throat smears have been taken for identification of meningococcus carriers. Swabs were taken from 2,287 steerage passengers and 44 carriers were found. Nose and throat smears were also taken from 1,207 Chinese crew of the Dollar Line ships, and 43 carriers were found.

PROGRESO, MEXICO

Acting Asst. Surg. C. E. Athey in charge. Post-office and telegraphic address, care American consulate, Progreso, Mexico.

Vessels departing from this port destined for the United States are inspected by the medical officer, who visits them daily to see that the regulations regarding the use of rat guards and the fending off are complied with. The crews and passengers of all vessels bound for United States ports are inspected and temperatures are taken prior to sailing and before giving the vessel a bill of health. A majority of vessels calling at this port take advantage of the privilege allowed them to postpone fumigation until they arrive at a United States port, as this gives the vessel more latitude in the matter of loading and unloading cargo. Only one vessel was fumigated at this port during the past fiscal year.

PUERTO MEXICO, MEXICO

Acting Asst. Surg. J. J. Sparks in charge. Post-office and telegraphic address, care British consulate, Puerto Mexico, Mexico.

Health conditions in Puerto Mexico during the year have been fairly good. There has been a slight increase in the number of malaria cases, probably due to the greater number of men employed in the oil fields and scattered over a larger area of the country than in previous years. The Rockefeller Foundation, in conjunction with the State authorities, has been actively combating hookworm and malaria. A great part of the low-lying swampy area surrounding the town has been drained or filled in.

The vice consulate at this port was closed on September 30, 1928, and the Public Health Service officer has since that date issued bills of health to departing vessels. The total number of bills of health issued was 75.

SHANGHAI, CHINA

Acting Asst. Surg. Thomas B. Dunn in charge. Post-office and telegraphic address, care American consulate, 1 Canton Road, Shanghai, China.

Shanghai is a rapidly growing city of an estimated population of about two million. Included in this number are 15,193 Japanese, 1,792 Americans, 6,018 British, 1,426 Portuguese, 3,374 Russians, and 3,297 other foreign nationalities. Practically all of the above-mentioned foreigners and about 821,000 of the nearly two million Chinese live in the Foreign Concession. The Foreign Concession is completely surrounded by the Chinese city, with no barriers or definite lines of demarcation. There is absolutely unrestricted intercommunication between the Foreign Concession and the Chinese city. Sanitation of the Foreign Concession is of fairly high standards, but to date no progress has been made to improve conditions in the Chinese city. However, there is a certain amount of public health education being carried out in connection with vaccination and measures for the prevention of cholera. During the last six months of the fiscal year 56,000 Chinese were vaccinated.

The danger of the introduction of cholera into the United States from Shanghai is minimized, owing to the length of time required in making the journey. However, this danger constitutes quite a problem with respect to Manila. This is true also with regard to smallpox. The strict measures enforced by the Philippine Health Service with regard to vaccination has done much to help this situation. The steamship companies are cooperating more fully in this regard. Three cases of smallpox were removed from ships in this port during the

year. Plague is a definite problem, due to the proximity to the great plague center in Manchuria. There have been no cases of plague in Shanghai for four years. Rat guards are carefully watched. Fumigation for the destruction of rats is performed by a local concern under the supervision of the service officer.

Meningococcus (cerebrospinal) meningitis has constituted a serious problem in Shanghai during the past year. There have been admitted to the Municipal Hospital 430 cases. This disease has also been reported by mission doctors from the interior of China. There have been no steerage passengers taken on at Shanghai for United States ports since March 31, 1929, as there are no facilities available for preembarkation, detention, and official observation, as prescribed in the regulations of the Secretary of the Treasury in accordance with Executive Order No. 5143, dated June 21, 1929.

Trachoma also constitutes a serious problem in Shanghai. Shipping companies before accepting orientals for entrance into the United States demand that a certificate be obtained from a competent foreign or foreign-trained Chinese doctor, stating that no trachoma and no communicable or intestinal parasites are present.

TAMPICO, MEXICO

Acting Asst. Surg. L. M. Taylor in charge. Post-office and telegraphic address, Comercio 52, Oriente, Tampico, Mexico.

During the fiscal year 1929, 625 vessels, tankers predominating, carrying 24,613 crew and 674 passengers destined to United States ports, were cleared from Tampico. This represents a decrease of 50 per cent in shipping during the past two years and is due to diversion of many tankers to the Venezuelan and Colombian trade. Forty-three vessels were fumigated with hydrocyanic-acid gas.

The general health and sanitary condition of the port remained unchanged during the year. Several factors, such as insufficient water supply and depressed business conditions, tend to maintain an ever-existing apathy toward civic hygiene. The splendidly organized campaign against mosquitoes enforced by Federal authorities has achieved a decrease in malaria deaths from 32 to 8 per cent of total deaths from infectious diseases. Measures have been resumed against the introduction of plague-infected rodents by mandatory fumigation prior to entry, together with rat guarding and fending off while in port of all vessels arriving from California ports. No evidence of infection was manifested in 52,324 rodents examined.

Daily plane service between Tampico and Brownsville, reducing travel time between the two cities by 33 hours, was inaugurated in January, and 232 passengers have left this port by this route, which promises to become a factor in interpublic transportation.

VERA CRUZ, MEXICO

Acting Asst. Surg. H. E. Gimler in charge. Post-office and telegraphic address, care American consulate, Vera Cruz, Mexico.

No cases of yellow fever, human plague, or rodent plague were reported during the year. Two cases of smallpox were reported on March 20, 1929. The inhabitants in the immediate district were vaccinated. Influenza was prevalent from December, 1928, to April, 1929. About 60 per cent of the population was affected, with 101 deaths. Antiplague work was carried out by the Mexican federal

public health service. During the year 16,109 rodents were trapped and examined and none was found infected. Antimosquito work was carried out by the "antilarvario" department of the Mexican federal public health service. A total of 4,721 mosquito-breeding places were found during the year; 17 of these proved to be *Aedes argenteus*. The sanitary condition of the port is not good; the sewage system is old and faulty; the water supply is inadequate; the drainage is poor; and the streets are not well cleaned. Recently a new public health department, called the "Unidad Sanitaria" was organized, and plans are in operation to improve sanitary conditions in general.

During the year 328 ships were dispatched from this port for ports in the United States. Of these ships, 39 were fumigated with hydrocyanic-acid gas for the destruction of rodents. The 20,668 members of crews and 8,299 passengers on these vessels were inspected. The passengers embarking at this port are of good type, consisting mostly of commercial travelers, tourists, school children, and a few Mexicans going to the United States to find employment. The vessels visiting this port are mostly combination freight and passenger steamers, bringing in general cargo and taking out bananas, coffee, minerals, hides, and other Mexican products.

SERVICE OPERATIONS IN EUROPE

Asst. Surg. Gen. Rupert Blue in charge. Post-office and telegraphic address, American Embassy, 5 Rue de Chaillot, Paris, France.

The office in Paris is the supervisory headquarters of the operations of the Public Health Service in Europe, which embraces quarantine and immigration activities and includes also miscellaneous medical services at the various consulates, to which officers are attached as medical advisers. In addition, this office is in close contact with the International Office of Public Hygiene, facilitating the exchange of sanitary information and simplifying cooperative activities of the service.

As in previous years, service officers have continued to serve in an advisory capacity to consular officers on medical questions in addition to advising on immigration and quarantine matters, inspecting the fumigation of vessels at certain ports, and collecting and transmitting sanitary information. A final medical examination of all immigrants destined for the United States was made by service officers just prior to embarkation. This examination is made with the cooperation of the medical representative of the transportation companies and constitutes a strong second line of defense against the entry into the United States of aliens who are inadmissible on medical grounds. Passengers from infected districts are assembled at least three days prior to embarkation. They are inspected for evidence of infestation and infection, disinfested when necessary, and are vaccinated against smallpox. This prior inspection and treatment are performed by trained personnel of the steamship companies, the final inspection being made by the service officer just prior to embarkation to determine whether or not the United States regulations have been properly observed.

During the past year, 303,238 passengers and 25,742 crew were inspected at all ports of embarkation. This figure includes those persons who were given treatment at primary ports and embark

direct, transmigrant passengers treated upon arrival at the various ports of embarkation which have come from other ports in Europe for final embarkation, and transmigrant passengers treated at the various ports where officers are stationed prior to proceeding to some other port for final embarkation. Of the passengers, 43,047 were vaccinated and 92,603 were disinfested for the prevention of the occurrence, respectively, of smallpox and typhus fever on board during the voyage.

During the year typhus fever continued to prevail in European and Mediterranean countries, Poland leading with the greatest number of cases and deaths. This disease also occurred to a limited degree in Northern Ireland, in April and May; 19 cases were recorded during the period mentioned. Passengers coming from this section, destined to the United States, were deloused and placed under observation in clean quarters for a period sufficient to complete 14 days from the date of disinfestation to the day of arrival at a port in the United States. Smallpox in mild form was prevalent in England, Wales, and Scotland throughout the year and appeared in Rotterdam, Holland, toward the end of the year. From late in July, 1928, to June, 1929, there were reported in England and Wales 8,044 cases with 9 deaths. A virulent form of this disease was introduced from the S. S. *Tuscania* from Bombay. Upon the arrival of this vessel at Marseille there was one case of smallpox on board, which was disembarked at Marseille. All passengers and crew were vaccinated prior to ship's subsequent arrival at Liverpool on April 1. The vessel arrived at Glasgow April 4 with 7 cases of smallpox on board. The total number of passengers and crew on board this steamer was 1,598; among these there occurred 45 cases, of which 7 were fatal. Of these 45 cases, 21 occurred in London and the south of England, 10 in the north of England, and 14 in Scotland.

The accompanying four tables summarize the quarantine activities of the various European ports where officers are stationed.

TABLE 6.—*Primary treatment of passengers and crew prior to embarkation*

Name of port	Passen- gers in- spected	Crew in- spec- pected	Passen- gers vac- ci- nated	Crew vac- ci- nated	Passen- gers de- loused	Crew de- loused	Passen- gers de- tained	Passen- gers re- jected
Antwerp.....	4,984	0	0	0	783	0	783	0
Belfast.....	2,146	0	0	0	302	0	0	2
Bremen.....	27,319	0	239	0	3,053	0	1,853	27
Cobh.....	24,538	0	0	0	11,249	0	0	1
Copenhagen.....	2,927	0	0	0	0	0	0	0
Danzig.....	7,557	0	0	0	6,854	0	0	0
Glasgow.....	15,857	0	0	0	0	0	2	0
Goteborg.....	17,872	0	0	0	504	0	0	0
Hamburg.....	39,971	0	565	0	3,160	0	1,978	19
Liverpool.....	27,199	0	3,007	0	1,045	0	0	1
London.....	2,776	0	0	0	0	0	0	0
Londonderry.....	4,688	0	0	0	522	0	0	0
Naples.....	42,951	12,699	28,301	0	29,681	0	0	0
Oslo.....	7,610	0	0	0	9	0	0	3
Patras.....	2,945	7,168	2,577	226	2,196	227	0	35
Piraeus.....	4,479	4,868	4,391	867	3,952	0	211	29
Palermo.....	2,433	0	2,243	0	537	0	91	16
Rotterdam.....	5,799	0	0	0	978	0	950	0
Southampton.....	23,002	1,007	784	125	441	0	12	2
Total.....	267,053	25,742	42,107	1,218	65,766	227	5,880	135

TABLE 7.—*Treatment of passengers coming from other points for embarkation (transmigrants)*

Treatment	Antwerp	Copenhagen	Goteborg	Liverpool	Rotterdam	Southampton	Total
Passengers inspected.....	777	1,608	319	1,702	1,112	4,230	9,748
Passengers vaccinated.....	0	0	0	128	0	453	581
Passengers deloused.....	0	28	228	0	22	852	1,130
Passengers detained.....	0	0	228	0	0	80	308
Passengers rejected.....	0	0	0	0	0	11	11
Baggage disinfected and passed.....	750	0	387	0	5	219	1,361
Baggage inspected and passed.....	100	0	0	0	10	559	659

TABLE 8.—*Primary treatment of passengers proceeding to another port for embarkation*

Treatment	Class	Antwerp	Danzig	Hamburg	Piraeus	Rotterdam	Total
Total transmigrants.....	(Second.....	0	1,064	51	15	5	1,135
	(Third.....	314	24,351	339	256	42	25,302
Passengers vaccinated.....	(Second.....	0	0	10	13	0	23
	(Third.....	0	0	81	255	0	336
Passengers deloused and passed.....	(Second.....	0	697	13	13	0	723
	(Third.....	309	24,273	151	251	0	24,984
Passengers inspected and passed without delousing.....	(Second.....	0	367	38	2	5	412
	(Third.....	5	78	188	5	42	318
Baggage disinfected and passed.....	(Second.....	0	882	22	10	0	914
	(Third.....	207	22,047	206	270	0	22,730
Baggage inspected and passed.....	(Second.....	0	0	51	16	0	67
	(Third.....	89	0	238	51	0	378
Country of departure:							
Albania.....		0	0	0	5	0	5
Cyprus.....		0	0	0	8	0	8
Danzig (free city).....		0	1	0	0	0	1
Estonia.....		2	47	0	0	0	49
Germany.....		0	11	223	0	0	234
Greece.....		0	0	0	214	0	214
Italy.....		0	0	0	44	0	44
Latvia.....		0	291	0	0	0	291
Lithuania.....		0	721	71	0	0	792
Poland.....		267	23,989	24	0	0	24,280
Rumania.....		15	1	70	0	0	86
Russia.....		0	350	2	0	47	399
Yugoslavia.....		30	0	0	0	0	30

TABLE 9.—*Treatment of baggage, vessels, and service beneficiaries*

Name of port	Baggage disinfected and passed	Baggage inspected and passed	Vessels inspected	Vessels fumigated	Bills of health countersigned	Medical examination of service beneficiaries
Antwerp.....	619	1,172	102	66	953	10
Belfast.....	65	526	0	0	76	45
Bergen.....	0	0	0	0	55	0
Bremen.....	2,699	1,568	0	120	359	0
Cobh.....	6,103	6,091	0	0	200	12
Copenhagen.....	0	0	0	0	223	10
Danzig.....	6,928	0	197	0	35	0
Dublin.....	0	0	0	0	48	0
Glasgow.....	0	0	0	0	350	6
Goteborg.....	0	0	45	0	140	2
Hamburg.....	6,434	76,596	243	167	937	4
Liverpool.....	5	1	0	78	685	2
London.....	0	0	21	119	739	17
Londonderry.....	168	345	0	0	26	0
Naples.....	39,260	37,309	203	16	311	83
Oslo.....	0	0	0	0	139	0
Patras.....	2,917	1,416	39	0	39	59
Piraeus.....	2,508	1,248	77	0	88	4
Palermo.....	1,337	2,533	15	2	125	12
Rotterdam.....	1,249	2,132	61	55	714	3
Southampton.....	519	0	0	0	457	6
Total.....	70,811	130,937	1,003	623	6,699	275

SUMMARY OF QUARANTINE TRANSACTIONS AT CONTINENTAL, INSULAR, AND FOREIGN STATIONS

TABLE 10.—*Summary of quarantine transactions at continental, insular, and foreign stations for the fiscal year ended June 30, 1929*

Station	Vessels inspected	Vessels fumigated	Passengers inspected ¹	Crew inspected	Bills of health, or port sanitary statements issued
Continental.....	19, 529	3, 791	933, 035	1, 134, 906	49, 269
Insular.....	2, 937	707	138, 947	203, 182	5, 450
Foreign.....	5, 401	990	544, 127	366, 762	11, 223
Total.....	27, 867	5, 488	1, 616, 109	1, 704, 850	65, 942

¹ Maritime stations, 823,668; border stations, 109,367. Statistics do not include "local" travelers at border stations, numbering 6,878,450, who, however, were under surveillance.

MEDICAL INSPECTION OF ALIENS

During the fiscal year there were examined by medical officers of the United States Public Health Service 973,974 alien passengers for the purpose of detecting physical or mental defects or diseases, as provided by the United States immigration laws, as compared with 1,178,482 for the fiscal year ended June 30, 1928, 881,699 for the fiscal year ended June 30, 1927, 614,972 for the fiscal year ended June 30, 1926, 545,472 for the fiscal year ended June 30, 1925, and 938,928 for the fiscal year ended June 30, 1924.

In addition, 984,771 alien seamen were inspected during the fiscal year ended June 30, 1929, as provided for in the act of February 5, 1917, as compared with 928,423 for the fiscal year ended June 30, 1928, 996,198 for the fiscal year ended June 30, 1927, 872,842 for the fiscal year ended June 30, 1926, 854,915 for the fiscal year ended June 30, 1925, and 874,962 for the fiscal year ended June 30, 1924. The accompanying tables present in detail the data relative to the inspection and certification of alien passengers and alien seamen.

On November 1, 1928, an officer of the Public Health Service was detailed for duty at the United States immigration station at Northport, Wash., in connection with the medical examination of arriving aliens. At the same time the Public Health Service office at Marcus, Wash., for this purpose was discontinued. This was done because of the fact that the port of entry for persons crossing the border at this point was transferred from Marcus to Northport.

The administration of the medical examination of arriving aliens along the Canadian border has been strengthened and extended, particularly east of the Great Lakes, in which sector increased facilities have been provided. The medical officer of the Public Health Service attached to the United States immigration station at Montreal, Canada, in connection with the medical examination of intending immigrants, in addition acts as technical adviser to the American consul at that place.

EXAMINATION OF PROSPECTIVE IMMIGRANTS ABROAD

There has been no material change during the past year in the system of making medical examinations of applicants for immigration visas in their countries of origin. The many advantages of this system of the examination of intending immigrants have been amply demonstrated during the four years past in which the plan has been in operation. The policy of making medical examinations, on request of the consul for the purpose of determining the admissibility of entire families or heads of families intending to emigrate to the United States, temporarily leaving the family behind, has done much to eliminate criticism of immigration enforcement on the ground that it causes separation of families. The system of conducting medical examination of intending immigrants prior to granting consular visa now is in effect in England, Scotland, Northern Ireland, Irish Free State, Belgium, Denmark, Holland, Germany, Czechoslovakia, Italy, Poland, Norway, and Sweden.

There were 173,740 applicants for immigration visas in countries of origin, examined by medical officers abroad. Of this number, 2,379 were reported to the consular officers as afflicted with one or more of the diseases listed in class A as mandatorily excludible; 15,468 were reported as afflicted with a disease or condition listed as class B and liable to affect their ability to earn a living; 2,379 of the applicants reported in class A and 5,589 of those reported in class B were refused immigration visas by the consular officers for medical reasons.

Of 165,772 aliens who had been passed in the preliminary medical examination abroad and to whom visas had been issued, only 22 were finally rejected upon arrival at a United States port as being afflicted with class A diseases, resulting in mandatory deportation.

TABLE 11.—*Alien passengers inspected and certified at all ports in the United States and its dependencies and in Canada*

Place	Number of alien passengers examined	Alien passengers certified			Total	Important diseases for which class A certification was made											Other dangerous or loathsome contagious diseases						
		Class A		Class B		Class C	Idiocy, imbecility, feeble-minded	Epilepsy	Insanity	Psychopathic inferiority	Chronic alcoholism	Tuberculosis	Trachoma	Favus	Syphilis	Soft chancre		Gonorrhea					
		(1) Idiocy, imbecility, feeble-minded, insanity, epilepsy, chronic alcoholism	(2) Tuberculosis or other contagious diseases	Diseases or defects which affect ability to earn a living.		Diseases or defects of less degree																	
<i>Atlantic Coast</i>																							
Baltimore, Md.	140		1	3	4																		
Beaufort, S. C.	0				0																		
Boston, Mass.	9,414	1	2	458	686			1				1											
Brunswick, Ga.	1				0																		
Calais, Me.	650	1		5	10																		
Charleston, S. C.	27				0																		
Eastport, Me.	5,628				0																		
Fall River, Mass.	7				0																		
Fernandina, Fla.	0				0																		
Fort Monroe, Va.	199			1	1																		
Georgetown, S. C.	0				0																		
Gloucester, Mass.	0				0																		
Jacksonville, Fla.	8				0																		
Key West, Fla.	8,376	2	1	37	40			1				1											
Lewes, Del.	0				0																		
Miami, Fla.	2,448				0																		
New Bedford, Mass.	86				0																		
New London, Conn.	1				0																		
Newport, R. I.	0				0																		
New York, N. Y.	315,376	29	118	10,841	11,800			4	2	17	6	13	39						8	10	29		
Perth Amboy, N. J.	0				0																		
Philadelphia, Pa.	435	1			1			1															
Plymouth, Mass.	0				0																		
Portland, Me.	73			1	1																		
Providence, R. I.	3,510		2	65	21								2										

[illegible]

TABLE 11.—*Alien passengers inspected and certified at all ports in the United States and its dependencies and in Canada—Continued*

Place	Number of alien passengers examined	Alien passengers certified				Total	Important diseases for which class A certification was made											
		Class A		Class B	Class C		Idiocy, imbecility, feeble-minded	Epilepsy	Insanity	Psychopathic inferiority	Chronic alcoholism	Tuberculosis	Trachoma	Favus	Syphilis	Soft chancre	Gonorrhea	Other dangerous or loathsome contagious diseases
		(1) Idiocy, imbecility, feeble-minded, insanity, epilepsy, loathsome or chronic alcoholism	(2) Tuberculosis or other contagious diseases	Diseases or defects which affects ability to earn a living.	Diseases or defects of less degree													
Mexican Border																		
Ajo, Ariz.	320	1	160	403	1	2	1	3	1							2		
Brownsville, Tex.	9,903	4	160	403	57	624	1									1	32	
Calexico, Calif.	5,066	2	39	15	86	142	2									7	9	
Columbus, N. Mex.	884					0												
Del Rio, Tex.	131,032				4	5												
Douglas, Ariz.	6,408	7	102	55	163	327										5	94	
Eagle Pass, Tex.	12,071	5	9	53	70	137										3		
El Paso, Tex.	28,468	15	214	522	390	1,141										2	6	
Hidalgo, Tex.	6,182	4	129	76	138	347	8									6	13	
Laredo, Ariz.	38,230	15	119	664	24	822	9									3	25	
Naco, Ariz.	4,590	9	43	24	114	190	2									1	9	
Nogales, Ariz.	20,185	18	218	328	500	1,064	4									28	19	
Presidio, Tex.	1,378	2	29	7	45	83										3	21	
Rio Grande, Tex.	5,766	4	26	11	25	94										1	25	
Roma, Tex.	13,434	48	21	19	25	94										1	38	
San Ysidro, Calif.	1,483	29	77	19	14	132	2									4	8	
Sasabe, Ariz.	837	7	1	7	11	15										1	1	
Thayer, Tex.	889					22										1		
Tucson, Ariz.	679	14	135	33	1	183	2									5	6	
Total	287,805	107	1,304	2,298	1,664	5,373	30	13	35	26	3	78	455	8	157	31	537	38
Canadian Border																		
Buffalo, N. Y.	7,978	11	4	161		176	3	4	4									
Detroit, Mich.	6,691	51	25	374	192	642	17	7	12	15		6	1			2		

[illegible]

¹ Closed November, 1929.

2 Opened November, 1929.

TABLE 11.—*Alien passengers inspected and certified at all ports in the United States and its dependencies and in Canada—Continued*

Place	Number of alien passengers examined	Alien passengers certified				Total	Important diseases for which class A certification was made											
		Class A		Class B	Class C		Idiocy, imbecility, feeble-minded	Epilepsy	Insanity	Psychopathic inferiority	Chronic alcoholism	Tuberculosis	Trachoma	Favus	Syphilis	Soft chancre	Gonorrhea	Other dangerous or loathsome con- tagious diseases
		(1) Idiocy, imbecility, feeble- minded, insanity, epilepsy, chronic alcoholism	(2) Tuberculosis or other contagious diseases	Diseases or defects which a fects ability to earn a living.	Diseases or defects of less degree													
<i>Porto Rico</i>																		
Porto Rico:	7,177		1	4	3	8										1		
San Juan.....	0					0												
Aguadilla.....	0					0												
Arecibo.....	0					0												
Arroyo.....	0					0												
Central Aguirre.....	0					0												
Fajardo.....	24					0												
Guanica.....	197		1			1									1			
Humacao.....	0					0												
Mayaguez.....	0					0												
Ponce.....	175					0												
Total.....	7,573	2	2	4	3	9									1	1		
Alaska: Ketchikan.....	5					0												
Total.....	973,974	440	1,857	18,103	4,539	24,939	137	56	124	114	9	195	590	10	199	51	674	138

TABLE 12.—*Alien seamen inspected and certified at all ports in the United States and Possessions*

Place	Number of alien seamen examined	Alien seaman certified				Total	Important diseases for which class A certification was made												
		Class A		Class B	Class C		Idiocy, imbecility, feeble-minded	Epilepsy	Insanity	Psychopathic inferiority	Chronic alcoholism	Tuberculosis	Trachoma	Favus	Syphilis	Soft chancre	Gonorrhea	Other dangerous or loathsome con- tagious diseases	
		(1) Idiocy, imbecility, feeble- minded, insanity, epilepsy, chronic alcoholism	(2) Tuberculosis or other contagious diseases	Diseases or defects which a fect ability to earn a living	Disease or defect of less degree														
Atlantic Coast																			
Baltimore, Md.	16,659	2	130	43	5	180		1	1			1			16	41	72		
Beaufort, S. C.	0					0													
Boston, Mass.	60,373	1	91	125	13	230		1				6	13		12	36	24		
Brunswick, Ga.	452					0													
Calais, Me.	125					0													
Charleston, S. C.	3,610		8	8	1	17										4	4		
Eastport, Me.	3,849					0													
Fall River, Mass.	718					0													
Fernandina, Fla.	37					0													
Fort Monroe, Va.	18,728	1	83	19	56	159		1				2			9	29	43		
Georgetown, S. C.	0					0													
Gloucester, Mass.	204		1	2	2	5										11	25		
Jacksonville, Fla.	2,430		39			39							1		1				
Key West, Fla.	3,844					0													
Lewes, Del.	41					0													
Miami, Fla.	10,023		9			9							1			4	4		
New Bedford, Mass.	48				4	4													
New London, Conn.	42					0													
Newport, R. I.	0					0													
New York, N. Y. (Ellis Island)	551,524	6	528	23	2	559		1	5			5	21		104	189	207	2	
Perth Amboy, N. J.	1,952		2			2									2				
Philadelphia, Pa.	32,052	2	137	6		145			1			2			49	6	80		
Portland, Me.	3,783		4	3		7													
Providence, R. I.	5,314		7	4		11						2				1	4		
Plymouth, Mass.	0					0													

[illegible]

TABLE 12.—*Alien seamen inspected and certified at all ports in the United States and Possessions—Continued*

Place	Number of alien seamen examined	Alien seaman certified				Total	Important diseases for which class A certification was made									Other dangerous or loathsome con- tagious diseases		
		Class A		Class B	Class C		Idiocy, imbecility, feeble-minded	Epilepsy	Insanity	Psychopathic inferiority	Chronic alcoholism	Tuberculosis	Trachoma	Favus	Syphilis		Soft chancre	Gonorrhea
		(1) Idiocy, imbecility, feeble- minded, insanity, epilepsy, chronic alcoholism	(2) Tuberculosis or other contagious diseases	Diseases or defects which affect ability to earn a living	Diseases or defects of less degree													
Porto Rico:																		
Aguadilla	29																	
Arecibo	28																	
Arroyo	0																	
Central Aguirre	0																	
Fajardo	45																	
Guánica	8,041		2												2			
Humacao	128																	
Mayaguez	200		1												1		3	
Ponce	1,908		3												6		6	
San Juan	17,918	1	19		4		1										7	
Total	28,297	1	25		4		1								8		10	
Alaska: Ketchikan	0																	
Total all stations	984,771	16	1,348	409	178		2	3	8	1	2	25	39	1	269	413	589	12

TABLE 13.—*Summary of medical inspection of aliens*

GROUP I.—ALIEN PASSENGERS NOT EXAMINED ABROAD, EXAMINED UPON ARRIVAL

Class	Total examined	Intensively examined	Passed	Certified on arrival				Total certified
				A-I	A-II	B	C	
First.....	657, 983	91, 726	646, 522	409	1, 587	6, 322	3, 143	11, 461
Second.....	85, 836	1, 181	85, 055	8	4	687	82	781
Third.....	111, 013	19, 338	106, 995	14	217	2, 567	1, 220	4, 018
Stowaways.....	943	720	891	3	33	15	1	52
Total.....	855, 775	112, 965	839, 463	434	1, 841	9, 591	4, 446	16, 312

GROUP II.—ALIEN PASSENGERS EXAMINED ABROAD, REEXAMINED ON ARRIVAL

Class	Total exam- ined	Inten- sively exam- ined	Passed abroad	Passed on ar- rival	Examination incom- plete, classification of condition noted abroad						Certified on arrival (condition not noted abroad)					Total certi- fied
					A-I	A-II	B	C	Num- ber certi- fied	A-I	A-II	B	C	Num- ber certi- fied		
First-----	8, 483	395	8, 116	8, 115	0	0	343	24	367	0	0	0	1	1	368	
Second-----	3, 297	2, 793	687	665	0	0	2, 606	4	2, 610	0	0	5	17	22	2, 632	
Third-----	106, 419	6, 707	100, 843	100, 792	0	0	5, 554	22	5, 576	6	16	4	25	51	5, 627	
Total-----	118, 199	9, 895	109, 646	109, 572	0	0	8, 503	50	8, 553	6	16	9	43	74	8, 627	

GROUP III.—ALIEN SEAMEN, EXAMINED ON ARRIVAL

Class	Total examined	Intensively examined	Passed	Certified				Total certified
				A-I	A-II	B	C	
Alien crew.....	984, 474	357, 784	982, 532	16	1, 343	405	178	1, 942
Workaways.....	297	238	293	-----	-----	4	-----	4
Total.....	984, 771	358, 022	982, 825	16	1, 343	409	178	1, 946

EUROPEAN PORTS

Asst. Surg. Gen. Rupert Blue in charge. Post office and telegraphic address, American Embassy, 5 Rue de Chaillot, Paris, France.

There has been no change in the system of the medical examination of applicants for visas at the consulates during the year. The character of the work has been essentially the same, except perhaps for the inauguration of research in intelligence testing for both adults and children. This work has been supervised by Surg. Lawrence Kolb at several places and has already given promise of considerable practical value when standards for testing various types of individuals have been established. About 500 persons of 15 years of age or more were examined at Warsaw, Poland; several hundred at Dublin, Irish Free State and nearly a hundred each at Oslo, Norway, and Southampton, England. Arrangements have been made to test children in a similar manner in Germany and Italy.

In making the tests, consideration has been given to the difference in education and other environmental factors. Nonlanguage char-

acter tests suitable to the culture of each type will be selected. It is the intention to examine with these tests a sufficient number of applicants to provide, if possible, a more equitable basis than now exists for the detection of mental deficiency in prospective immigrants.

There has been no extension of the system to other countries during the year; it now embraces England, Scotland, Northern Ireland, Irish Free State, Belgium, Denmark, Holland, Germany, Czechoslovakia, Italy, Poland, Norway, and Sweden.

Cooperation between the services engaged in immigration work abroad, namely, the Department of State, the Department of Labor, and the Public Health Service, has been characterized by the greatest cordiality on the part of the officials at all stations.

The attitude of the public toward the examinations as reported from the stations is tolerant and even favorable in most countries. Selective immigration seems to be recognized more and more as the right of any country toward which the tide of immigration is flowing.

There were medically examined during the year 173,740 applicants, as compared with 167,033 for the fiscal year 1928. The increase is due largely to the increased number of quota aliens applying at the consulates in Great Britain, Northern Ireland, Irish Free State, Germany, Poland, Italy, Czechoslovakia, and Norway. The quota applicants comprised 81.2 per cent, nonquota applicants 18.7 per cent, and nonimmigrants 0.03 per cent.

TABLE 14.—*Distribution according to class of applicants for immigration visas who were medically examined at each station, July 1, 1928, to June 30, 1929*

Country and consular office	Total applicants examined	Number of applicants in each class			Percentage of applicants in each class		
		Quota	Non-quota	Nonimmigrants	Quota	Non-quota	Nonimmigrants
Belgium: Antwerp.....	1,093	727	366	0	66.5	33.5	0.00
England, total.....	12,844	10,683	2,158	3	83.1	16.8	0.02
Liverpool.....	4,879	4,217	661	1	86.4	13.5	0.02
London.....	4,968	3,777	1,190	1	76.0	23.9	0.02
Southampton.....	2,997	2,689	307	1	89.7	10.2	0.03
Irish Free State, total.....	23,928	23,292	626	10	97.3	2.6	0.04
Cobh.....	8,339	8,075	263	1	96.8	3.1	0.01
Dublin.....	15,589	15,217	363	9	97.6	2.3	0.06
Northern Ireland: Belfast.....	3,769	3,517	247	5	93.3	6.6	0.13
Scotland: Glasgow.....	14,246	13,208	1,038	0	92.7	7.3	0.00
Germany, total.....	55,771	53,787	1,982	2	96.4	3.5	0.004
Berlin.....	12,171	11,567	602	2	95.0	4.9	0.02
Bremen.....	6,421	6,121	300	0	95.3	4.7	0.00
Cologne.....	13,346	12,926	420	0	96.8	3.2	0.00
Hamburg.....	6,635	6,291	344	0	94.9	5.1	0.00
Stuttgart.....	17,198	16,882	316	0	98.1	1.9	0.00
Holland: Rotterdam.....	2,176	1,927	249	0	88.5	11.5	0.00
Poland: Warsaw.....	11,539	6,009	5,530	0	52.1	47.9	0.00
Denmark: Copenhagen.....	3,408	3,102	306	0	91.0	9.0	0.00
Norway, total.....	7,446	6,882	564	0	92.4	7.6	0.00
Bergen.....	2,925	2,709	216	0	92.6	7.4	0.00
Oslo.....	4,521	4,173	348	0	92.3	7.7	0.00

TABLE 14.—*Distribution according to class of applicants for immigration visas who were medically examined at each station, July 1, 1928, to June 30, 1929—Con.*

Country and consular office	Total applicants examined	Number of applicants in each class			Percentage of applicants in each		
		Quota	Non-quota	Nonimmigrants	Quota	Non-quota	Nonimmigrants
Sweden, total.....	10, 186	9, 613	572	1	94. 3	5. 6	0. 009
Goteborg.....	5, 917	5, 546	371	0	93. 7	6. 3	0. 00
Stockholm.....	4, 269	4, 067	201	1	95. 2	4. 7	0. 02
Italy, total.....	21, 905	5, 304	16, 562	39	24. 2	75. 6	0. 13
Genoa.....	3, 567	989	2, 578	0	27. 7	72. 3	0. 00
Naples.....	14, 750	3, 615	11, 135	0	24. 5	75. 5	0. 00
Palermo.....	3, 588	700	2, 849	39	19. 5	79. 4	1. 08
Czechoslovakia: Prague.....	5, 429	3, 104	2, 325	0	57. 2	42. 8	0. 00
All countries.....	173, 740	141, 155	32, 525	60	81. 2	18. 7	0. 03

TABLE 15.—*Distribution according to sex of applicants for immigration visas who were medically examined at each station, July 1, 1928, to June 30, 1929*

Country and consular office	Number of each sex examined		Percentage of each sex examined	
	Male	Female	Male	Female
Belgium: Antwerp.....	578	515	52. 8	47. 2
England:				
Liverpool.....	2, 357	2, 522	48. 3	51. 7
London.....	2, 267	2, 701	45. 6	54. 4
Southampton.....	1, 687	1, 310	56. 3	43. 7
Irish Free State:				
Cohh.....	3, 947	4, 392	47. 3	52. 7
Dublin.....	7, 116	8, 473	45. 6	54. 4
Northern Ireland: Belfast.....	1, 975	1, 794	52. 4	47. 6
Scotland: Glasgow.....	6, 711	7, 535	47. 1	52. 9
Germany:				
Berlin.....	6, 060	6, 111	49. 8	50. 2
Bremen.....	3, 296	3, 125	51. 3	48. 7
Cologne.....	6, 866	6, 480	51. 4	48. 6
Hamburg.....	3, 296	3, 339	49. 7	50. 3
Stuttgart.....	7, 796	9, 402	45. 3	54. 7
Holland: Rotterdam.....	1, 119	1, 057	51. 4	48. 6
Poland: Warsaw.....	4, 807	6, 732	41. 6	58. 4
Denmark: Copehnagen.....	2, 166	1, 242	63. 5	36. 5
Norway:				
Bergen.....	1, 762	1, 163	60. 2	39. 8
Oslo.....	2, 208	2, 313	48. 8	51. 2
Sweden:				
Goteborg.....	3, 648	2, 269	61. 6	38. 4
Stockholm.....	2, 451	1, 818	57. 4	42. 6
Italy:				
Genoa.....	1, 378	2, 189	38. 6	61. 4
Naples.....	5, 481	9, 269	37. 2	62. 8
Palermo.....	1, 392	2, 196	38. 8	61. 2
Czechoslovakia: Prague.....	2, 367	3, 062	43. 6	56. 4
All countries.....	82, 731	91, 009	47. 6	52. 4

It will be noted, in the columns of Table 15, that of the total number examined the males comprised 47.6 per cent and the females 52.4 per cent. The countries furnishing an excess of females over male applicants were Italy, Irish Free State, Germany, and Poland. In the preceding fiscal year the percentages were males 51.3 per cent and females 48.7 per cent, respectively.

TABLE 16.—*Number and percentage of applicants medically examined who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929*

Country and consular office	Number notified for—			Percentage of applicants examined who were notified for—		
	Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B
Belgium: Antwerp.....	15	184	199	1.4	16.8	18.2
England:						
Liverpool.....	15	616	631	.3	12.6	12.9
London.....	14	473	487	.3	9.5	9.8
Southampton.....	21	305	326	.7	10.1	10.8
Irish Free State:						
Cobh.....	168	884	1,052	2.0	10.6	12.6
Dublin.....	263	1,151	1,414	1.7	7.4	9.1
Northern Ireland: Belfast.....	63	423	486	1.7	11.2	12.9
Scotland: Glasgow.....	57	1,008	1,065	.4	7.0	7.4
Germany:						
Berlin.....	246	787	1,033	2.0	6.4	8.4
Bremen.....	54	382	436	.8	5.9	6.7
Cologne.....	62	920	982	.4	6.9	7.3
Hamburg.....	76	472	548	1.1	7.1	8.2
Stuttgart.....	113	918	1,031	.6	5.3	5.9
Holland: Rotterdam.....	10	206	216	.5	9.4	9.9
Poland: Warsaw.....	477	1,645	2,122	4.1	14.2	18.3
Denmark: Copenhagen.....	5	306	311	.1	8.9	9.0
Norway:						
Bergen.....	9	263	272	.3	8.9	9.2
Oslo.....	27	334	361	.6	7.3	7.9
Sweden:						
Goteborg.....	48	374	422	.8	6.3	7.1
Stockholm.....	27	432	459	.6	10.1	10.7
Italy:						
Genoa.....	138	637	775	3.8	17.8	21.6
Naples.....	184	1,654	1,838	1.2	11.2	12.4
Palermo.....	159	626	785	4.4	17.4	21.8
Czechoslovakia: Prague.....	128	468	596	2.4	8.6	11.0
All countries.....	2,379	15,468	17,847	1.4	8.9	10.3

Of the number examined 17,847, or 10.3 per cent, were found to have notifiable mental or physical defects under classes A and B, of whom 7,968, or 4.6 per cent, were refused visas (see Table 21) as compared with 7,750, or 4.6 per cent, for the preceding year. Of the quota aliens rejected, 5.1 per cent were males and 4.5 per cent females; of the nonquota, there were males 4.2 per cent, and females 3 per cent (see Table 28). It would appear from the above figures that the females generally were of a better physical type than the males.

Of the total number examined, 5,009 applicants, 2.9 per cent, were deferred for the correction of remediable physical disabilities. Of this number 90.2 per cent were eventually granted visas following satisfactory correction.

TABLE 17.—*Percentage distribution of male and female applicants examined, notified according to class of disability, July 1, 1928, to June 30, 1929*

Country and consular office	Percentage of applicants who had—		Percentage of males who had—		Percentage of females who had—	
	Class A condition	Class B condition	Class A condition	Class B condition	Class A condition	Class B condition
Belgium: Antwerp.....	1.4	16.8	1.4	16.2	1.3	17.4
England:						
Liverpool.....	.3	12.6	.3	10.8	.3	14.3
London.....	.3	9.5	.4	9.1	.1	9.8
Southampton.....	.7	10.1	.9	9.6	.4	10.8
Irish Free State:						
Cobh.....	2.0	10.6	1.4	9.7	2.6	11.3
Dublin.....	1.7	7.4	1.5	7.3	1.8	7.4
Northern Ireland: Belfast.....	1.7	11.2	1.1	9.5	2.3	13.1
Scotland: Glasgow.....	.4	7.0	.5	9.1	.3	5.2
Germany:						
Berlin.....	2.0	6.4	2.1	6.5	1.9	6.4
Bremen.....	.8	5.9	.6	6.0	1.0	5.8
Cologne.....	.4	6.9	.5	5.5	.4	8.3
Hamburg.....	1.1	7.1	1.1	7.3	1.2	6.8
Stuttgart.....	.6	5.3	.6	4.8	.7	5.7
Holland: Rotterdam.....	.5	9.4	.5	10.6	.4	8.2
Poland: Warsaw.....	4.1	14.2	3.9	13.5	4.2	14.7
Denmark: Copenhagen.....	.1	8.9	.1	8.5	.1	9.7
Norway:						
Bergen.....	.3	8.9	.4	10.7	.2	6.4
Oslo.....	.6	7.3	.6	5.9	.5	8.7
Sweden:						
Göteborg.....	.8	6.3	.9	5.4	.7	7.8
Stockholm.....	.6	10.1	.7	8.8	.5	11.8
Italy:						
Genoa.....	3.8	17.8	4.4	19.4	3.5	16.8
Naples.....	1.2	11.2	1.3	14.5	1.2	9.2
Palermo.....	4.4	17.4	5.1	20.1	3.9	15.7
Czechoslovakia: Prague.....	2.4	8.6	1.9	8.5	2.7	8.7
All countries.....	1.4	8.9	1.2	8.7	1.5	9.0

Table 17 shows the percentage distribution of male and female applicants notified, according to the class of disability. Of total number examined, 1.4 per cent were notified for class A conditions, and 8.9 per cent for class B disabilities. Of the total number of males examined, 1.2 per cent were notified for class A and 8.7 per cent for class B; and of the total number of females examined 1.5 per cent were notified for class A conditions, and 9.0 per cent for class B conditions. Poland took the lead in supplying the highest percentage of class A notifications, the percentage being 4.1 of the total examined, while Italy, Czechoslovakia, and Germany follow in the order named.

TABLE 18.—*Number and percentage of quota applicants examined who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929*

Country	Total number of quota applicants examined	Number notified			Per cent of total examined who were notified		
		Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B
Belgium.....	727	9	125	134	1.2	17.1	18.3
England.....	10,683	41	1,173	1,214	.4	10.9	11.3
Irish Free State.....	23,292	425	1,932	2,357	1.8	8.3	10.1
Northern Ireland.....	3,517	60	375	435	1.7	10.6	11.3
Scotland.....	13,208	52	950	1,002	.4	7.1	7.5
Germany.....	53,787	526	3,316	3,842	.9	6.2	7.1
Holland.....	1,927	9	175	184	.5	9.5	10.0
Poland.....	6,009	240	1,212	1,452	3.9	20.1	24.0
Denmark.....	3,102	5	252	257	.2	8.1	8.3
Norway.....	6,882	32	508	540	.5	7.3	7.8
Sweden.....	9,613	66	718	784	.7	7.4	8.1
Italy.....	5,304	85	1,760	1,845	1.6	33.1	34.7
Czechoslovakia.....	3,104	43	299	342	1.4	9.6	11.0
All countries.....	141,155	1,593	12,795	14,388	1.1	9.1	10.2

TABLE 19.—*Number and percentage of nonquota applicants examined who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929*

Country	Total number of nonquota applicants examined	Number notified			Per cent of total examined who were notified		
		Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B
Belgium.....	366	6	59	65	1.6	16.1	17.7
England.....	2, 158	7	221	228	.3	10.2	10.5
Irish Free State.....	626	5	99	104	.8	15.8	16.6
Northern Ireland.....	247	3	46	49	1.2	18.6	19.8
Scotland.....	1, 038	5	58	63	.5	5.6	6.1
Germany.....	1, 982	24	163	187	1.2	8.2	9.4
Holland.....	249	1	31	32	.4	12.4	12.8
Poland.....	5, 530	237	433	670	4.2	7.8	12.0
Denmark.....	306	0	54	54	0	17.6	17.6
Norway.....	564	4	89	93	.7	15.7	16.4
Sweden.....	572	8	88	96	1.4	15.3	16.7
Italy.....	16, 562	394	1, 152	1, 546	2.4	6.9	9.3
Czechoslovakia.....	2, 325	85	169	254	3.6	7.3	10.9
All countries.....	32, 525	779	2, 662	3, 441	2.4	8.2	10.6

The quota group furnishes the lower rate of aliens notified for the different classes of disabilities; of 141,155 examined, 14,388, or 10.2 per cent were notified for class A and class B conditions; while of 32,524 nonquota applicants examined, 3,441, or 10.6 per cent, were certified for medical reasons. During the fiscal year 1928, of 137,712 quota applicants, 14,101, or 10.2 per cent, were notified for all classes of disabilities, and of the 28,896 nonquota applicants, 3,127, or 10.8 per cent, were notified.

TABLE 20.—*Percentage distribution of total quota and nonquota applicants of each sex examined who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929*

Country	Quota						Nonquota					
	Male			Female			Male			Female		
	Class A	Class B	Classes A and B	Class A	Class B	Classes A and B	Class A	Class B	Classes A and B	Class A	Class B	Classes A and B
Belgium.....	1.0	15.5	16.5	1.5	19.1	20.6	2.1	17.8	19.9	1.1	14.3	15.4
England.....	.5	9.8	10.3	.2	12.1	12.3	.3	10.2	10.5	.3	10.2	10.5
Irish Free State.....	1.5	8.0	9.5	2.1	8.5	10.6	.7	14.1	14.8	.9	17.2	18.1
Northern Ireland.....	1.0	9.4	10.4	2.4	12.0	14.4	1.6	10.1	11.7	.8	26.3	27.1
Scotland.....	.5	9.3	9.8	.3	5.3	5.6	.6	6.7	7.3	.4	4.5	4.9
Germany.....	.9	5.7	6.6	.9	6.5	7.4	.9	8.7	9.6	1.5	7.6	9.1
Holland.....	.5	9.6	10.1	.4	8.4	8.8	.8	17.9	18.7	0	6.6	6.6
Poland.....	3.7	17.7	21.4	4.2	22.1	26.3	4.1	8.2	12.3	4.3	7.6	11.9
Denmark.....	.1	8.1	8.2	.2	8.1	8.3	0	14.4	14.4	0	20.4	20.4
Norway.....	.5	7.5	8.0	.4	7.2	7.6	.7	15.3	16.0	.7	15.8	16.5
Sweden.....	.7	6.4	7.1	.6	9.0	9.6	1.9	13.5	15.4	.8	17.7	18.5
Italy.....	1.9	36.5	38.4	1.3	30.3	31.6	2.6	7.9	10.5	2.2	6.4	8.6
Czechoslovakia.....	.9	8.7	9.6	1.7	10.4	12.1	3.3	8.0	11.3	3.8	6.7	10.5
All countries.....	1.0	8.7	9.7	1.2	9.4	10.6	2.4	8.9	11.3	2.4	7.7	10.1

TABLE 21.—*Number and percentage of total applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929*

Country and consular office	Number visas refused for—			Percentage of applicants examined who were refused visas for—		
	Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B
Belgium: Antwerp.....	15	23	38	1.4	2.1	3.5
England:						
Liverpool.....	15	258	273	.3	5.3	5.6
London.....	14	33	47	.3	.6	.9
Southampton.....	21	53	74	.7	1.7	2.4
Irish Free State:						
Cobh.....	168	558	726	2.0	6.7	8.7
Dublin.....	263	899	1,162	1.7	5.7	7.4
Northern Ireland: Belfast.....	63	222	285	1.7	5.8	7.5
Scotland: Glasgow.....	57	306	363	.4	2.1	2.5
Germany:						
Berlin.....	246	472	718	2.0	3.8	5.8
Bremen.....	54	124	178	.8	1.9	2.7
Cologne.....	62	704	766	.4	5.2	5.6
Hamburg.....	76	266	342	1.1	4.0	5.1
Stuttgart.....	113	599	712	.6	3.5	4.1
Holland: Rotterdam.....	10	62	72	.5	2.8	3.3
Poland: Warsaw.....	477	69	546	4.1	.6	4.7
Denmark: Copenhagen.....	5	127	132	.1	3.7	3.8
Norway:						
Bergen.....	9	117	126	.3	4.0	4.3
Oslo.....	27	130	157	.6	2.8	3.4
Sweden:						
Goteborg.....	48	111	159	.8	1.8	2.6
Stockholm.....	27	105	132	.6	2.4	3.0
Italy:						
Genoa.....	138	82	220	3.8	2.3	6.1
Naples.....	184	36	220	1.2	.2	1.4
Palermo.....	159	37	196	4.4	1.0	5.4
Czechoslovakia: Prague.....	128	196	324	2.4	3.6	6.0
All countries.....	2,379	5,589	7,968	1.4	3.2	4.6

TABLE 22.—*Percentage distribution of male and female applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929*

Country and consular office	Percentage of males who were refused visas for—			Percentage of females who were refused visas for—		
	Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B
Belgium: Antwerp.....	1.4	2.3	3.7	1.3	1.9	3.2
England:						
Liverpool.....	.3	6.3	6.6	.3	4.3	4.6
London.....	.4	1.2	1.6	.1	.2	.3
Southampton.....	.9	2.3	3.2	.4	1.0	1.4
Irish Free State:						
Cobh.....	1.4	6.9	8.3	2.6	6.4	9.0
Dublin.....	1.5	6.2	7.7	1.8	5.4	7.2
Northern Ireland: Belfast.....	1.1	6.5	7.6	2.3	5.2	7.5
Scotland: Glasgow.....	.5	3.0	3.5	.3	1.3	1.6
Germany:						
Berlin.....	2.1	4.1	6.2	1.9	3.6	5.5
Bremen.....	.6	2.5	3.1	1.0	1.3	2.3
Cologne.....	.5	4.4	4.9	.4	6.1	6.5
Hamburg.....	1.1	4.8	5.9	1.2	3.2	4.4
Stuttgart.....	.6	3.3	3.9	.7	3.3	4.0
Holland: Rotterdam.....	.5	3.8	4.3	.4	1.8	2.2
Poland: Warsaw.....	3.9	1.1	5.0	4.2	.2	4.4
Denmark: Copenhagen.....	.1	4.6	4.7	.1	2.2	2.3
Norway:						
Bergen.....	.4	5.4	5.8	.2	1.8	2.0
Oslo.....	.6	3.0	3.6	.5	2.7	3.2
Sweden:						
Goteborg.....	.9	2.0	2.9	.7	1.6	2.3
Stockholm.....	.7	2.8	3.5	.5	1.9	2.4
Italy:						
Genoa.....	4.4	3.7	8.1	3.5	1.4	4.9
Naples.....	1.3	.4	1.7	1.2	.1	1.3
Palermo.....	5.1	2.1	7.2	3.9	.4	4.3
Czechoslovakia: Prague.....	1.9	5.1	7.0	2.7	2.4	5.1
All countries.....	1.2	3.7	4.9	1.5	2.7	4.2

The percentage of applicants notified for class B conditions who were refused visas is shown on Table 23.

TABLE 23.—*Percentage of male and female applicants notified for class B disabilities who were refused visas on medical grounds, July 1, 1928, to June 30, 1929*

Country and consular office	Number of applicants notified for class B conditions			Number of applicants who were refused visas for class B conditions			Percentage of applicants notified who were refused visas for class B conditions		
	Male	Female	Total, male and female	Male	Female	Total, male and female	Male	Female	Total, male and female
Belgium: Antwerp.....	94	90	184	13	10	23	13.8	11.1	12.5
England:									
Liverpool.....	255	361	616	148	110	258	58.0	30.4	41.8
London.....	206	267	473	28	5	33	13.6	1.8	7.0
Southampton.....	163	142	305	40	13	53	24.5	9.1	17.3
Irish Free State:									
Cobh.....	386	498	884	276	282	558	71.5	56.6	63.1
Dublin.....	520	631	1,151	442	457	899	85.0	72.4	78.1
Northern Ireland: Belfast.....	158	235	423	129	93	222	68.6	39.5	52.4
Scotland: Glasgow.....	612	396	1,008	204	102	306	33.3	25.8	30.3
Germany:									
Berlin.....	393	394	787	259	222	472	63.6	56.3	59.9
Bremen.....	199	183	382	83	41	124	41.7	22.4	32.4
Cologne.....	351	539	920	306	398	704	80.3	73.8	76.5
Hamburg.....	243	229	472	158	108	266	62.9	47.1	56.4
Stuttgart.....	376	542	918	285	314	599	75.8	57.7	65.2
Holland: Rotterdam.....	119	87	206	43	19	62	36.1	21.8	30.1
Poland: Warsaw.....	652	993	1,645	56	13	69	8.6	1.3	4.2
Denmark: Copenhagen.....	185	121	306	100	27	127	54.0	22.3	41.5
Norway:									
Bergen.....	189	74	263	96	21	117	50.8	28.4	44.4
Oslo.....	132	202	334	66	64	130	50.0	31.6	38.9
Sweden:									
Goteborg.....	197	177	374	74	37	111	37.5	20.9	29.6
Stockholm.....	217	215	432	69	36	105	31.8	16.7	24.3
Italy:									
Genoa.....	268	369	637	52	30	82	19.4	8.1	12.8
Naples.....	799	855	1,654	25	11	36	3.1	1.3	2.2
Palermo.....	280	346	626	29	8	37	10.3	2.3	5.9
Czechoslovakia: Prague.....	201	267	468	121	75	196	60.2	28.1	41.8
All countries.....	7,255	8,213	15,468	3,093	2,496	5,589	42.6	30.4	36.1

It will be noted that 36.1 per cent of all cases notified were rejected, but that the percentage of males rejected was 42.6 and of females 30.4.

TABLE 24.—*Number and percentage of total quota applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929*

Country	Number examined	Number who were refused visas			Per cent of number examined who were refused visas		
		Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B
Belgium.....	727	9	13	22	1.2	1.8	3.0
England.....	10,683	41	331	372	.4	3.0	3.4
Irish Free State.....	23,292	425	1,429	1,854	1.8	6.1	7.9
Northern Ireland.....	3,517	60	213	273	1.7	6.0	7.7
Scotland.....	13,208	52	294	346	.4	2.2	2.6
Germany.....	35,787	526	2,139	2,665	.9	5.9	6.8
Holland.....	1,927	9	57	66	.5	2.9	3.4
Poland.....	6,009	240	39	279	3.9	.6	4.5
Denmark.....	3,102	5	119	124	.2	3.8	4.0
Norway.....	6,882	32	240	272	.5	3.5	4.0
Sweden.....	9,613	66	209	275	.7	2.1	2.8
Italy.....	5,304	85	58	143	1.6	1.1	2.7
Czechoslovakia.....	2,104	43	109	152	1.4	3.5	4.9
All countries.....	141,155	1,593	5,250	6,843	1.1	3.7	4.8

An analysis of the compilation in Table 24 shows that 141,155 quota applicants were examined at the various stations during the year, and that 6,843, or 4.8 per cent of the number, were refused visas for medical reasons, of which 1,593, or 1.1 per cent, were class A, and 5,250, or 3.7 per cent, were class B.

TABLE 25.—*Number and percentage of total nonquota applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929*

Country	Number examined	Number who were refused visas			Per cent of number who were refused visas		
		Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B
Belgium.....	366	6	10	16	1.6	2.7	4.3
England.....	2,158	7	13	20	.3	.6	.9
Irish Free State.....	626	5	26	31	.8	4.1	4.9
Northern Ireland.....	247	3	9	12	1.2	3.6	4.8
Scotland.....	1,038	5	12	17	.5	1.1	1.6
Germany.....	1,982	24	26	50	1.2	1.3	2.5
Holland.....	249	1	5	6	.4	2.0	2.4
Poland.....	5,530	237	30	267	4.2	.5	4.7
Denmark.....	306	-----	8	8	-----	2.6	2.6
Norway.....	564	4	7	11	.7	1.2	1.9
Sweden.....	572	8	7	15	1.4	1.2	2.6
Italy.....	16,562	394	97	491	2.4	.6	3.0
Czechoslovakia.....	2,325	85	87	172	3.6	3.7	7.3
All countries.....	32,525	779	337	1,116	2.4	1.0	3.4

Of the nonquota applicants, 32,525 were examined and 1,116, or 3.4 per cent, were refused, classified as follows: Class A conditions 779, or 2.4 per cent, and class B conditions 337, or 1 per cent.

The highest percentages of quota aliens refused visas on account of certifiable physical and mental disabilities were observed in the Irish Free State, Northern Ireland, Germany, and Poland, in the order named. Czechoslovakia, Irish Free State, Northern Ireland, and Poland take the lead in the nonquota group.

About 48 out of every 1,000 examined were rejected for certifiable conditions among the quota applicants, and 34 out of every 1,000 examined among the nonquota group.

TABLE 26.—*Percentage distribution of the total quota applicants notified for each class of disabilities who were refused visas on medical grounds, July 1, 1928, to June 30, 1929*

Country	Number notified			Number refused visas			Per cent of notified refused visas		
	Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B
Belgium.....	9	125	134	9	13	22	100.0	10.4	16.4
England.....	41	1,173	1,214	41	331	372	100.0	28.2	30.6
Irish Free State.....	425	1,932	2,357	425	1,429	1,854	100.0	73.9	78.6
Northern Ireland.....	60	375	435	60	213	273	100.0	56.8	62.5
Scotland.....	52	950	1,002	52	294	346	100.0	30.9	34.5
Germany.....	526	3,316	3,842	526	2,139	2,665	100.0	64.5	69.3
Holland.....	9	175	184	9	57	66	100.0	32.5	35.8
Poland.....	240	1,212	1,452	240	39	279	100.0	3.2	19.2
Denmark.....	5	252	257	5	119	124	100.0	47.2	48.2
Norway.....	32	508	540	32	240	272	100.0	47.2	50.4
Sweden.....	66	718	784	66	209	275	100.0	29.1	35.0
Italy.....	85	1,760	1,845	85	58	143	100.0	3.2	7.7
Czechoslovakia.....	43	299	342	43	109	152	100.0	36.4	44.4
All countries.....	1,593	12,795	14,388	1,593	5,250	6,843	100.0	41.0	47.5

TABLE 27.—*Percentage distribution of the total nonquota applicants notified for each class of disability who were refused visas on medical grounds, July 1, 1928, to June 30, 1929*

Country	Number notified			Number refused visas			Per cent of notified refused visas		
	Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B	Class A conditions	Class B conditions	Total, classes A and B
Belgium.....	6	59	65	6	19	16	100.0	16.9	24.6
England.....	7	221	228	7	13	20	100.0	5.9	8.7
Irish Free State.....	5	99	104	5	26	31	100.0	26.2	29.8
Northern Ireland.....	3	46	49	3	9	12	100.0	19.5	24.4
Scotland.....	5	58	63	5	12	17	100.0	20.7	27.0
Germany.....	24	163	187	24	26	50	100.0	15.9	26.7
Holland.....	1	31	32	1	5	6	100.0	16.1	18.7
Poland.....	237	433	670	237	30	267	100.0	6.9	39.8
Denmark.....	0	54	54	0	8	8	0	14.8	14.8
Norway.....	4	89	93	4	7	11	100.0	7.8	11.8
Sweden.....	8	88	96	8	7	15	100.0	7.9	15.6
Italy.....	394	1,152	1,546	394	97	491	100.0	8.4	31.7
Czechoslovakia.....	85	169	254	85	87	172	100.0	51.4	67.7
All countries.....	779	2,662	3,441	779	337	1,116	100.0	12.6	32.4

TABLE 28.—*Percentage distribution of total quota and nonquota applicants of each sex examined who were refused visas on medical notification, July 1, 1928, to June 30, 1929*

Country	Quota						Nonquota					
	Male			Female			Male			Female		
	Class A	Class B	Classes A and B	Class A	Class B	Classes A and B	Class A	Class B	Classes A and B	Class A	Class B	Classes A and B
Belgium.....	1.0	2.0	3.0	1.5	1.5	3.0	2.1	2.7	4.8	1.1	2.7	3.8
England.....	.5	3.9	4.4	.2	2.3	2.5	.3	.7	1.0	.3	.5	.8
Irish Free State.....	1.5	6.5	8.0	2.1	5.8	7.9	.7	5.1	5.8	.9	3.2	4.1
Northern Ireland.....	1.0	6.7	7.7	2.4	5.2	7.6	1.6	2.5	4.1	.8	4.6	5.4
Scotland.....	.5	3.1	3.6	.3	1.3	1.6	.6	2.1	2.7	.4	.2	.6
Germany.....	.9	4.0	4.9	.9	3.9	4.8	.9	1.9	2.8	1.5	.7	2.5
Holland.....	.5	3.8	4.3	.4	2.0	2.4	.8	3.9	4.7	.0	.0	.0
Poland.....	3.7	1.2	4.9	4.2	.2	4.4	4.1	1.1	5.2	4.3	.2	4.5
Denmark.....	.1	4.8	4.9	.2	2.0	2.2	.0	2.1	2.1	.0	3.1	3.1
Norway.....	.5	4.3	4.8	.4	2.5	2.9	.7	1.0	1.7	.7	1.4	2.1
Sweden.....	.7	2.4	3.1	.6	1.8	2.4	1.9	.9	2.8	.8	1.5	2.3
Italy.....	1.9	1.4	3.3	1.3	.8	2.1	2.6	1.2	3.8	2.2	.2	2.4
Czechoslovakia.....	.9	4.3	5.2	1.7	2.7	4.4	3.3	6.3	9.6	3.8	2.0	5.8
All countries.....	1.0	4.1	5.1	1.2	3.3	4.5	2.4	1.8	4.2	2.4	.6	3.0

TABLE 29.—*Percentage distribution of total quota and nonquota applicants of each sex notified who were refused visas on medical grounds, July 1, 1928, to June 30, 1929*

Country	Quota						Nonquota					
	Male			Female			Male			Female		
	Class A	Class B	Classes A and B	Class A	Class B	Classes A and B	Class A	Class B	Classes A and B	Class A	Class B	Classes A and B
Belgium.....	100.0	13.1	18.3	100.0	7.8	14.5	100.0	15.1	24.3	100.0	19.2	25.0
England.....	100.0	39.7	43.1	100.0	18.7	29.2	100.0	6.9	9.6	100.0	5.6	8.0
Irish Free State.....	100.0	81.3	84.2	100.0	68.0	74.3	100.0	36.6	39.5	100.0	18.9	22.9
Northern Ireland.....	100.0	72.9	74.7	100.0	43.5	53.1	100.0	25.0	35.7	100.0	17.6	20.0
Scotland.....	100.0	33.4	36.9	100.0	27.1	30.7	100.0	32.3	37.8	100.0	4.2	11.5
Germany.....	100.0	70.6	74.9	100.0	59.9	64.6	100.0	21.8	29.1	100.0	9.2	24.1
Holland.....	100.0	39.6	42.5	100.0	24.0	27.7	100.0	21.7	25.0	100.0	0	0
Poland.....	100.0	6.8	22.9	100.0	.8	16.7	100.0	13.3	42.5	100.0	2.7	38.1
Denmark.....	100.0	59.1	59.8	100.0	25.0	26.6	0	14.3	14.3	0	15.1	15.1
Norway.....	100.0	57.4	60.1	100.0	35.0	38.5	100.0	6.8	10.9	100.0	8.8	12.7
Sweden.....	100.0	37.7	44.3	100.0	19.8	24.6	100.0	7.0	18.3	100.0	8.8	12.7
Italy.....	100.0	3.8	8.8	100.0	2.7	6.6	100.0	1.5	3.6	100.0	3.6	28.4
Czechoslovakia.....	100.0	49.6	51.6	100.0	26.7	37.3	100.0	78.3	84.7	100.0	30.5	55.7
All countries.....	100.0	46.9	52.6	100.0	35.6	42.9	100.0	19.7	36.6	100.0	7.3	29.3

TABLE 30.—*Number and percentage of quota and nonquota applicants of each sex who were refused visas for mental conditions, July 1, 1928, to June 30, 1929*

Country	Quota						Nonquota					
	Male			Female			Male			Female		
	Number examined	Number refused	Per cent refused	Number examined	Number refused	Per cent refused	Number examined	Number refused	Per cent refused	Number examined	Number refused	Per cent refused
Belgium.....	393	1	0.25	331	3	0.89	185	0	0.00	181	2	1.10
England.....	5,321	15	.28	5,362	8	.15	988	2	.20	1,170	2	.17
Irish Free State.....	10,767	88	.81	12,525	206	1.64	290	1	.34	336	3	.89
Northern Ireland.....	1,854	13	.70	1,663	37	2.22	118	0	.00	129	1	.77
Scotland.....	6,204	27	.43	7,004	15	.21	507	2	.39	531	1	.19
Germany.....	26,320	163	.62	27,467	198	.71	994	6	.60	988	11	1.10
Holland.....	991	2	.20	936	2	.21	128	0	.00	121	0	.00
Poland.....	2,694	14	.52	3,315	36	1.08	2,113	27	1.27	3,417	70	2.04
Denmark.....	2,021	2	.09	1,681	2	.18	145	0	.00	161	0	.00
Norway.....	3,689	7	.19	3,193	2	.06	281	0	.00	283	1	.35
Sweden.....	5,781	24	.41	3,832	10	.26	318	5	1.57	254	1	.39
Italy.....	2,409	16	.66	2,895	11	.38	5,818	37	.63	10,744	67	.62
Czechoslovakia.....	1,450	7	.48	1,654	20	1.20	917	18	1.96	1,408	46	3.26
All countries.....	69,894	379	.54	71,261	550	.77	12,802	98	.76	19,723	205	1.04

It is of interest to note in Table 30 the results of the tests applied at the stations to determine the mental capacities of applicants for American visas. A total of 173,680 were examined, of which number 141,155 were quota and 32,525 nonquota aliens. The percentage of refusals for mental defects among the quota applicants were 0.54 per cent for males and 0.77 per cent for females, and in the nonquota group it was 0.76 per cent for males and 1.04 per cent for females. A total of 1,232, or 0.71 per cent, were refused for all countries on account of mental defects.

Of particular interest to the health authorities of the United States are the notification for tuberculosis, mental conditions, and other mandatorily excludible diseases found in Table 31.

TABLE 31.—*Number and character of the more serious mandatorily excludible conditions notified, July 1, 1928, to June 30, 1929*

Nature of defect	Belgium	England	Irish Free State	North Ireland	Scotland	Germany	Holland	Poland	Denmark	Norway	Sweden	Italy	Czechoslovakia	Total
Alcoholism.....	0	0	3	0	1	3	0	0	0	1	0	0	0	8
Epilepsy.....	1	0	1	0	0	1	1	1	0	0	0	3	0	8
Favus.....	0	0	0	0	0	0	2	0	0	0	0	20	0	22
Feeble-mindedness.....	0	8	7	1	0	50	3	69	4	2	12	35	6	197
Imbecility.....	0	0	1	0	1	3	0	8	0	0	2	8	3	26
Insanity.....	0	0	1	0	0	8	0	1	0	0	1	3	0	14
Loathsome contagious diseases.....	0	4	55	2	6	3	0	111	0	1	30	58	3	293
Mentally defective.....	5	10	260	46	40	235	0	66	0	5	19	58	76	820
Psychopathic inferiority.....	0	9	27	4	3	61	1	2	0	2	5	12	3	129
Trachoma.....	6	4	13	0	0	6	0	173	0	0	1	265	14	482
Tuberculosis pulmonary.....	0	2	27	3	1	109	2	49	0	4	11	26	10	244
Tuberculosis other forms.....	1	1	9	2	3	13	1	2	0	8	4	15	8	67
Veneral diseases.....	2	11	26	5	2	41	0	4	1	9	14	15	3	133
Senile dementia.....	0	0	0	0	0	1	0	0	0	0	0	1	3	5
Manic depressive psychosis.....	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Nervous instability.....	0	0	0	0	0	8	0	0	0	0	0	0	0	8
Mentally depressed.....	0	0	0	0	0	2	0	0	0	0	0	0	0	2

On referring to these data it will be noted that 244 aliens suffering from pulmonary tuberculosis and 67 from all other forms of the disease were excluded in accordance with the provisions of the immigration act. Moreover, there were detected and refused 14 cases of insanity, 197 cases of feeble-mindedness, 820 cases of mental defectiveness, and 129 cases of psychopathic inferiority.

The value of the preliminary examination of entire family units in which the head of the family intended to emigrate to the United States, leaving the family behind, is well demonstrated in those instances in which such examinations have been made. Ninety-six heads of families, of a total of 489 families comprising 932 members, were refused or declined visas. Five members of these families were found on preliminary medical examination to have class A conditions and 113, class B conditions. However, because of departmental ruling to the effect that no sound member of the family otherwise admissible can be refused a visa even when a remaining member of the family group is found inadmissible, the heads of such families seldom declined a visa. This practice is probably, in large measure, responsible for the complaint frequently made by naturalized citizens with regard to the separation of families when at a later date some member or members of those remaining behind are refused visas for class A mental or physical conditions. For instance, at one consulate during the year the husband was granted a visa in conformity with this ruling although the wife was found upon this preliminary medical examination to have a class A condition; similar action was taken in the case of the head of another family, consisting of four persons, of which the son was found to have tuberculosis. It is reported that a number of individuals voluntarily separate themselves from their families under such circumstances in a mistaken belief that after they have been granted citizenship in the United States, the refused members of their families will then be eligible to admission.

REPRESENTATION AT INTERNATIONAL AND OTHER CONFERENCES

The chief medical officer in supervisory charge of the work of the service in Europe attended the following meetings: The Royal

Sanitary Institute Congress, held at Plymouth, July 16 to 21, 1928; the International Hospital Congress, meeting of the International Executive Committee, held under the auspices of the League of Red Cross Societies, at Paris, France, August 29 and 30, 1928; the International Congress of Tropical Medicine, Centenary Celebration of the Faculty of Medicine, held at Cairo, Egypt, December 15 to 22, 1928; represented the United States at the Fourth Meeting of the Permanent Committee for the Study of Occupational Diseases, held at Lyon, France, beginning April 3, 1929; the meeting of the permanent committee of the Office International d'Hygiène Publique, held at Paris May 13 to 22, 1929; First International Congress of Sanitary Aviation, held at Paris, May 14 to 20, 1929.

REPORTS FROM IMMIGRATION STATIONS

NEW YORK (ELLIS ISLAND), N. Y.

Senior Surg. C. H. Lavinder in charge. Post-office and telegraphic address, Ellis Island, N. Y.

With the passage in the last few years of restrictive immigration laws, and with the extension of the medical examination of intending immigrants abroad in the principal countries of origin by officers of the Public Health Service, the administration of this station has undergone considerable change and its activities have necessarily been modified in many ways. In general, the administrative units have remained the same and the activities are, as in former years, divided into three divisions: Boarding division, line division, and hospital division.

The location of the boarding division, housed in the barge office, Battery Park, New York City, is ideal for its purpose. First, because of its central location it is easily accessible to all piers in New York harbor and other more or less distant points where vessels dock, thus reducing travel time to a minimum. Second, the office is on the same floor as and contiguous to the suite occupied by the immigration inspectors, which is supplied with the facilities necessary for the conduct of the work of this division. Following the inauguration of the conduct of the medical examination of prospective immigrants abroad it became unnecessary to conduct at Ellis Island the medical examination of such third-class or steerage passengers as have been examined abroad, and such persons now receive a confirmatory medical examination on shipboard; only alien third-class or steerage passengers who have not been medically examined abroad and alien passengers of first and second classes who are suspected upon arrival to be afflicted with a certifiable condition are now removed to Ellis Island. The net result of this change in procedure has been to shift the major part of the work from Ellis Island to shipboard; prior to the inauguration of the conduct of the medical examination of intending immigrants abroad all alien third-class or steerage passengers were routinely removed to Ellis Island for a medical examination, and only the arriving aliens in first and second classes were medically examined on shipboard. Now fully 95 per cent of all arriving alien third-class passengers are given final medical examination on shipboard.

With the exception of those vessels carrying seven passengers or less, all other passenger vessels are boarded in the bay from a cutter

as soon as they are released from quarantine, and the examinations are performed while the vessel is en route to the pier. By this procedure much of the examination has been completed before the vessel reaches the pier, and considerable time is saved both by the immigrant and the medical officer conducting the examination as well as by the vessel. As a result of this examination, all aliens with diseases or defects, whether observed by the examining officer or ascertained from medical memoranda executed by officers of the Public Health Service stationed abroad for the purpose of making preliminary medical examinations, are set aside for a further examination to the extent indicated in each particular case under consideration. As a result of this second examination, an alien may be passed, certified or held for further observation at Ellis Island. In view of the fact that four months may elapse between time of preliminary medical examination and the granting of a visa, and the actual arrival of an alien, it is obvious that diseases or defects may become existent which are not covered by the medical memorandum which has been furnished the alien by the Public Health Service officer abroad at the time of the preliminary medical examination; also any medical condition noted on the memorandum may have become more serious or, on the other hand, may have been cured or remedied by the time the passenger reaches this country. Hence it is essential for the protection of this country, as well as for that of the alien, that the final medical inspection be made just prior to landing in the United States. In the course of the final medical examination on shipboard particular attention is paid to the eyes, scalp, skin, locomotion, and mental reaction of the alien. After the examination of alien passengers has been completed, the alien members of the crew are examined in accordance with section 20 (a) of the immigration act of 1924 to detect any mandatory excludable diseases. Transportation down the bay is furnished to the Public Health Service officers by the harbor cutters of the United States Coast Guard, which at the same time carry the United States customs and immigration officers to incoming vessels.

The medical work of the line division in the administrative building at Ellis Island has followed, in general, the procedures of previous years. Following are some of the duties of the medical officers on duty at Ellis Island: Examination of aliens not examined abroad; reexamination of aliens held for further medical examination; reexamination of landed aliens, when requested by immigration authorities; serving on medical boards; giving medical testimony before boards of special inquiry; furnishing the Bureau of Immigration with medical opinion regarding certain aliens, and other miscellaneous duties in connection with the conduct of the medical inspection of aliens. From time to time it becomes necessary also for the various medical officers of the line division to augment the force on duty in the boarding division.

Since the inauguration of the conduct of the medical examination of intending immigrants abroad Public Health Service officers detailed for this work are given a final intensive course of training at Ellis Island prior to taking up these duties abroad. This training has proved very beneficial, as the medical officers not only reviews the laws and regulations in force pertaining to this work, but also are afforded a better understanding of the problems actually confronted by the medical officers on this side in connection with arriving aliens

who have had preliminary medical examination abroad prior to securing visa.

BOSTON, MASS.

Acting Asst. Surg. A. J. Nute in charge. Post-office and telegraphic address, 287 Marginal Street, East Boston, Mass.

Immigration passing through Boston presents all types, physically and mentally, Great Britain, Irish Free State, Canada, and Newfoundland furnishing the majority. Eleven passenger lines maintained regular service and an irregular schedule was carried on by freight ships with accommodations for a few passengers from ports in Europe, Asia, Africa, and Central and South America. During the year 4,026 aliens applied for admission for permanent residence and 5,388 were temporary visitors and reentry permit holders. Primary inspection of passengers and crew were conducted on shipboard or on the docks, depending upon the number of passengers on board. Secondary or intensive examinations were made in the privacy of a room on the pier, at the detention station, or in a hospital. Medical certificates of mental or physical defect or disease were issued against 686 passengers and 230 seamen.

In the administration of the immigration law Boston is a district headquarters and a Chinese port of entry for a large portion of New England. Medical inspections and investigations are not limited to the city of Boston, but include any place in the area where no Public Health Service officer is on duty. Three medical officers are required to cover this territory, subject to call at any time, for the purpose of inspecting arriving aliens or investigating the medical status of aliens held under warrant proceedings in any public institution. Chinese applicants were inspected at the immigration station as legal requirement for admission and, owing to protracted stay as steerage passengers in limited space on board ship, were carefully checked for evidence of any acute or chronic communicable infection prior to detention. Scabies was common and infestation with intestinal parasites was almost universal among Chinese applicants for first admission. Those afflicted with scabies and hookworm disease were required to undergo treatment until free from evidence of the disease before being released to enter the country.

Aliens arriving as regular passengers may be classified as follows: First, those examined abroad by United States Public Health Service medical officers, coming to the United States for permanent residence, reentry permit holders, and temporary visitors; and, second, aliens from quota and nonquota countries, coming for permanent residence, who have not had a prior medical examination. The first group have shown a steady improvement since the inauguration of this work abroad. The second group require more careful inspection. A certain number of the temporary visitor group annually become a problem by seeking to remain indefinitely, claiming that their physical condition does not permit a safe return to the country of origin. The third class presents the usual pre-war type arriving from the same localities, and during the past year 449 of this group were certified upon arrival for disease or defect.

In addition to the medical examination of alien passengers, a total of 60,373 alien seamen were examined during the year, of which number 230 were certified for disease or defect.

AJO, ARIZ.

Acting Asst. Surg. O. B. Patton in charge. Post-office and telegraphic address, Ajo, Ariz.

The majority of aliens presented for medical inspection at this port are of the Mexican peon class coming from the rural section in southern Sonora, Mexico, and other Mexicans who enter for a short visit in the United States or to make purchases. Because of the fact that there is no American consul stationed near Ajo to facilitate compliance with the visa requirements for bona fide immigrants, practically all this class of immigration enters through Nogales, that port of entry being the nearest at which an American consul is stationed. American tourist travel to Mexico via Ajo is almost nil, because of the poor accommodations in Mexico and the bad condition of the roads in this vicinity in the two countries. Vaccination for smallpox has been rigorously adhered to at this port. At the close of the fiscal year eight cases of smallpox were housed in the pest hospital at Ajo, and all persons, irrespective of citizenship, are required to be vaccinated or present evidence of a recent successful vaccination. No cases of this disease have been reported in northern Sonora, directly across the border.

BLAINE, WASH.

Acting Asst. Surg. M. A. Keyes in charge. Post-office and telegraphic address, Blaine, Wash.

During the past year the number of aliens entering the United States at this point totaled 231,149. Of this number, 4,735 were aliens seeking permanent homes. There has been a general improvement in the type of immigrant crossing the border at this point. While the majority of these come direct from Canada, some are from other countries who arrive at this port via Canada, and represent all types—farmers, clerks, professional classes, and others. The number of passengers arriving by auto stage continues to increase very steadily; the number arriving by this mode of transportation now surpasses the number arriving by train. Three different lines are now operating between Canada and this port, with a total of 15 stages a day. With the completion of the new customs-immigration building here the facilities available for making the medical inspection of aliens at this port will be much improved.

BROWNSVILLE, TEX.

Surg. J. G. Wilson in charge. Post-office and telegraphic address, Brownsville, Tex.

With the completion of the new international bridge across the Rio Grande River at this point, the old ferry ceased to operate and all foot and vehicular traffic since July 1, 1928, has been via the new bridge, over which 9,903 aliens have entered the United States during the year. Of these, 3,269 were bona fide immigrants seeking permanent homes in the United States, 6,630 were local crossers entering for the purpose of paying social visits or transacting business not involving employment or residence in the United States, and 4 were aliens in transit to other countries. During the past year more rigid enforcement by the Immigration Service of the immigration laws relating to local crossers has added materially to the work at this

station. It has been necessary to extend the intensive examination to include all persons making practically no distinction as regards medical examination between bona fide immigrants and local crossers. As a result, 624 aliens were certified during the year for physical or mental defects.

Facilities for making medical examinations of aliens in the new quarters in the bridgehead building are a decided improvement over those formerly in use and greatly facilitated the performance of the medical inspection. This building is occupied jointly by the Customs Service, Immigration Service, and the Public Health Service.

On March 9, 1929, an international airport was opened by the city of Brownsville. The Pan American Airways Co. now operates a fleet of passenger and mail planes which make daily trips to and from Mexico City and Tampico. The Corporacion Aeronautica de Transportes S. A. also utilizes this field, making a trip every day except Sunday to and from Mazatlan on the west coast of Mexico, and stopping en route at the interior points of Durango, Torreon, and Monterrey. Since the opening of the airport 106 planes carrying passengers have arrived and been inspected and 120 aliens examined. The passengers arriving by this mode of transportation are of good sanitary type. The facilities for making the medical examinations of these passengers have not been entirely adequate, but a new building has just recently been completed, and it is anticipated that the Public Health Service will occupy suitable quarters there in the future.

The Public Health Service officer stationed at this port unofficially cooperates with the United States consul stationed in Matamoras, which is immediately across the border, by giving advice regarding the physical and mental condition of aliens seeking visas at that consulate.

BUFFALO, N. Y.

Acting Asst. Surg. W. L. Savage in charge. Post-office and telegraphic address, Buffalo, N. Y. Under the general supervision of Surg. F. C. Turner.

Owing to the operation of the quota law and the concomitant physical examination of intending immigrants abroad prior to granting visa for admission to the United States, the physical and mental condition of arriving aliens is of a much higher type than in former years. In addition to the medical examination of aliens at the port of Buffalo, the medical officer also examines aliens held for medical examination at Black Rock and at the Peace Bridge, the latter connecting with Fort Erie across the border. At Black Rock the immigration offices are located in the railroad station and the conduct of the medical examination of aliens is made at that place. From April until December the work at the Black Rock station is very heavy and the medical officer is compelled to be on actual duty from 12 to 15 hours daily. During the fiscal year ended June 30, 1929, 7,978 alien passengers and 34,473 alien members of crew were examined at this port.

CALAIS, ME.

Acting Asst. Surg. W. H. Bunker in charge. Post-office and telegraphic address, Calais, Me.

The immigration inspection service at the International Bridge is continuous the year round, the inspectors working in three 8-hour

shifts. Medical examinations were conducted during daylight hours only and aliens arriving at other hours were turned back and told to report during daytime for examination. During the fiscal year 650 aliens were inspected, and of this number 10 were certified for various defects or diseases.

CALEXICO, CALIF.

Acting Asst. Surg. A. L. Rice in charge. Post-office and telegraphic address, Calexico, Calif.

The majority of aliens seeking entry at this port are Mexicans, with a few Canadians, Japanese, and Chinese. The medical officer is very often called upon by the immigration authorities to examine aliens who have been apprehended while entering the United States illegally or who are illegally residing in the United States in California. During the year 5,066 aliens were inspected; 583 vaccinations were performed

DETROIT, MICH.

Surg. H. E. Trimble in charge. Post-office and telegraphic address, Detroit, Mich.

The types of immigrant landing at this port are mainly native-born Canadians, British subjects temporarily domiciled in Canada, and some continental Europeans. It is expected that the new Ambassador Bridge will be opened to traffic in December, 1929, at which time it will undoubtedly be necessary to detail a full-time medical officer for duty at this point in addition to the officer now on duty at the immigration station at the foot of Woodward Avenue. Aliens arriving through the new tunnel, now under construction, will be taken care of at the office at the foot of Woodward Avenue. During the fiscal year 6,691 aliens were examined at this port.

DOUGLAS, ARIZ.

Acting Asst. Surg. E. W. Adamson in charge. Post-office and telegraphic address, Douglas, Ariz.

The port of Douglas, Ariz., is the port of entry for a large portion of the State of Sonora, Mexico. The chief line of transportation is a branch line of the Southern Pacific Railway Co., known as the Ferrocarril de Nacozari, a line about 80 kilometers long, terminating at the milling town of Nacozari, Sonora, Mexico. This line receives most of its business from the mines located at Pilares, Sonora, Mexico, the mills of Nacozari, Sonora, Mexico, and from the El Tigre Mining Co. at El Tigre, Sonora, Mexico. In addition, auto stage and truck lines have recently begun to operate between Sonora and Douglas, and according to the degree of peacefulness train service runs every day except Sunday, arriving in Agua Prieta, Sonora, Mexico, opposite Douglas on Mondays, Wednesdays, and Fridays and departing therefrom on following days.

The type of Mexican alien applying for admission at this port is largely fairly high class; most of them are well fed, well clothed, and in good physical condition. The majority have been vaccinated successfully against smallpox, as a result of the activities of the company surgeons of the several mining companies. Six thousand four hundred and eight alien passengers were inspected during the fiscal year ended June 30 1929.

DULUTH, MINN.

Acting Asst. Surg. E. L. Cheney in charge. Post-office and telegraphic address, Duluth, Minn.

There was a marked reduction in the number of passenger vessels carrying aliens arriving at this port during the year; this was due to the wrecking and abandonment of the steamer *American* and the stranding of the steamer *Huronie*. The aliens passing through this port are of an exceptionally high class, and examination revealed comparatively few defects or diseases. Of 5,772 persons passing through this port, 17 were aliens seeking permanent entry, and 1,959 held temporary permits.

EASTPORT, ME.

Acting Asst. Surg. J. E. Brooks in charge. Post-office and telegraphic address, Eastport, Me.

During the past year 76,196 persons entered this port, the majority of which entered for the purpose of trading in the United States or for short visits with relatives in this country and remained only for a few hours or days. A second group entering were destined to the canning and lumbering industries along the border with the intention of returning to their homes at the close of the working season. This latter group of aliens is much inferior to the others, both mentally and physically.

The regular lines of travel entering Eastport consist of a daily mail service running between this port and the adjacent Canadian villages; a 4-trip daily service between this port and Campobello; a daily steamship service from the Canadian ports of St. John, St. Stephen, and St. Andrews; and a 2-trip-a-week service by the steamers of the Eastern Steamship Co. between Eastport and St. John. In addition, many persons arrive by private motor boats and land at the most convenient landing and at any time of the day or night. All these boats are met by the immigration officials, and such aliens as require medical examination are sent to the office of the medical officer for examination.

EASTPORT, IDAHO

Acting Asst. Surg. T. H. de Lespinasse in charge. Post-office and telegraphic address, Eastport, Idaho.

The majority of aliens entering through this port come by automobile. These aliens are from every walk in life, but the majority are above the average and are in good physical condition, so medical examination reveals comparatively few defects or diseases. Among the visiting class the majority are those who desire to get away from the rigors of the cold winters in the north. In spite of the poor mountain roads through this part of the country, this port is one of the main points of entry and is on one of the most direct routes to all parts of the country located south and west. The increase of traffic by automobile has added greatly to the work at this station, so that the medical officer is compelled to be in touch with the immigration officials at all times of the day. During the fiscal year 20,787 aliens applied for admission into the United States at this port of entry. This figure includes aliens of all classes; i. e., visitors and transients in addition to those immigrants who desire to make their domicile in

the United States. A total of 2,172 of these about 10 per cent, were referred to the medical officer by the immigration officials for medical examination.

EL PASO, TEX.

Surg. J. R. Hurley in charge. Post-office and telegraphic address 321 Mills Building, El Paso, Tex.

While the great majority of aliens seeking admission into the United States at El Paso are Mexicans, there is nevertheless a small number of other nationalities who desire entrance for a brief period on business or recreation or pass through this port en route to other foreign countries. The type of immigrant passing through this port is very good from a medical standpoint. For the most part the Mexican aliens seeking admission are farmers who have led an arduous outdoor life and physically are in a very good condition. Of a total of 28,468 aliens examined at El Paso during the fiscal year, but 229 were certified as being afflicted with class A conditions making them mandatorily excludible. A great many of the other defects encountered were the results of industrial accidents; i. e., loss of hand or foot, loss of vision of one eye, and similar conditions which would not markedly affect ability to earn a living.

Owing to the reconstruction work on the Santa Fe Street International Bridge at El Paso, in progress during the year, examinations were carried on under unusually difficult conditions. A part of the entrants were diverted to the Stanton Street Bridge, about one-half mile distant, so that persons were arriving over two bridges instead of the usual one. During the latter part of the fiscal year the hours permitting the international bridges to be open for crossing were extended from 9 p. m. until midnight, which added considerably to the work at this station. The medical officer at El Paso also has supervision over the medical inspection of arriving aliens at Guadalupe Gate, a small subport of entry 38 miles east of El Paso. There was opened during the latter part of the fiscal year a new bridge across the Rio Grande near Ysleta, 12 miles distant, over which the medical officer at El Paso has supervision as regards the medical examination of arriving aliens. When the roads are improved on the Mexican side leading to the Ysleta Bridge and its facilities become better known to the public, it is anticipated that entrants over this bridge will increase considerably in number, at which time it will probably be necessary to appoint an additional medical officer to make the required examinations.

ERIE, PA.

Acting Asst. Surg. Hugh M. Moorhead in charge. Post-office and telegraphic address, 217 West Eighth Street, Erie, Pa.

The medical inspection of aliens at Erie, Pa., is confined, for the most part, to alien seamen, most of whom come from the British Provinces. The medical officer is occasionally requested by the immigration authorities to medically examine an alien who has illegally made entry into Erie. During the fiscal year ended June 30, 1929, 72 alien seamen were inspected.

FALL RIVER, MASS.

Acting Asst. Surg. Thomas Cox in charge. Post-office and telegraphic address, 1244 Pleasant Street, Fall River, Mass.

During the fiscal year ended June 30, 1929, a total of 39 vessels arrived at this port from foreign ports carrying 718 alien seamen and 7 alien passengers. The number of ships arriving during the past year from foreign ports was less than that during the preceding fiscal year. This decrease in shipping was due to a gradual decrease in business at the local oil plant until March 1, 1929, when the ownership of this plant changed hands. Since that date the increase in shipping has been marked.

FORT MONROE, VA.

Surg. J. W. Kerr in charge. Post-office and telegraphic address, Fort Monroe, Va.

During the fiscal year 199 passengers and 18,728 seamen were inspected at this port. Practically none of the passengers aboard arriving vessels are landed here; the majority are aboard vessels calling here for bunker coal. Eighty vessels not subject to quarantine inspection, carrying 2,016 alien seamen, were boarded for the purpose of examining aliens. These vessels come from Canadian ports or from the Panama Canal.

GLOUCESTER, MASS.

Acting Asst. Surg. E. B. Hallett in charge. Post-office and telegraphic address, 139 Main Street, Gloucester, Mass.

For the most part the medical inspection of aliens at this station consists of the examination of alien seamen, most of whom come from the British Provinces. There are also a considerable number who come from European ports in salt ships. Upon the arrival at this port of a ship on which there are aliens, the medical officer is notified by the immigration inspector and immediately boards the ship and makes the medical immigration examination. During the fiscal year 204 alien seamen were inspected, 5 of whom were certified as having diseases or defects.

HALIFAX, NOVA SCOTIA

Acting Asst. Surg. F. V. Woodbury in charge. Post-office and telegraphic address, Halifax, Nova Scotia.

During the year, steamer lines brought 739 aliens, originating mostly in northwestern Europe and bound for points from Detroit west. The remainder of arriving immigrants consisted of border cases, practically all being bound for the New England States. This migration has gone on fairly consistently for generations and the individuals are of a high class. During the fiscal year, 7,249 aliens entered through the port of Halifax, 2,841 of whom were given a medical examination.

HONOLULU, HAWAII

Surg. Hugh de Valin in charge. (Relieved by Senior Surg. S. B. Grubbs June 1, 1929.) Post-office and telegraphic address, Honolulu, Hawaii.

During the fiscal year 1929, 6,559 aliens entered the port of Honolulu. The majority of these aliens were resident orientals who had been to China and Japan and were returning to their homes under

return permits. A great many aliens pass through in transit or stop over as temporary visitors. The medical inspection of first and second class passengers is conducted on board arriving vessels, while practically all third-class passengers are taken to the immigration station for examination. Routine stool examinations for hookworm infection were discontinued at the beginning of the fiscal year. Twenty-one thousand seven hundred and forty-eight alien seamen were inspected during the year, and 11 were certified as being afflicted with a disease or defect.

HIDALGO, TEX.

Acting Asst. Surg. W. P. Woodall in charge. Post-office and telegraphic address, Hidalgo, Tex.

Immigration at this port has been almost exclusively Mexican. Six thousand one hundred and eighty-two aliens were examined medically during the year. Of this number, 567 were bona fide immigrants and were required by the immigration authorities to undergo an intensive examination. In the stricter enforcement of existing immigration laws many illegal entrants have been apprehended and detained for deportation. From time to time medical services are extended to sick aliens at a distance from the station, generally in the Hidalgo County Jail, some 25 miles distant.

HOULTON, ME.

Acting Asst. Surg. E. C. Bates in charge. Post-office and telegraphic address, Houlton, Me.

Immigration at this port consists for the most part of aliens arriving from Canada, being mostly farmers and laborers and their families, who are of good sanitary type. Traffic through this port has increased considerably in the past few years on account of the large tourist traffic. Of a total of 781 aliens medically examined, only 5 were certified as being afflicted with disease or defect.

INTERNATIONAL FALLS, MINN.

Acting Asst. Surg. M. E. Withrow in charge. Post-office and telegraphic address, International Falls, Minn.

During the year 300,825 passengers were inspected at this port. Of this number 142,676 were aliens. A large number of these aliens were from southeastern European countries and had been for some time domiciled in Canada. In addition to making examinations of aliens passing through this port the medical officer provided medical attention to the aliens in the county jail awaiting deportation. Because of a severe epidemic of influenza among this latter class of aliens, the work of the medical officer increased fourfold over former years.

JACKSONVILLE, FLA.

Acting Asst. Surg. R. S. Wynn in charge. Post-office and telegraphic address, Jacksonville, Fla.

Because of the fact that the foreign ships entering this port are, for the most part, cargo vessels, the immigration work consists almost exclusively of the examination of alien seamen. No passenger lines

bringing immigrants entered during the year. The small total of 8 passengers arrived at this port seeking admission—5 of these were British, 1 French, and 1 German. The medical examination is performed aboard ship immediately upon arrival.

JACKMAN, ME.

Acting Asst. Surg. E. D. Humphreys in charge. Post-office and telegraphic address, Jackman, Me.

The immigration work at this port consists for the most part of the examination of aliens arriving from Canada via the Canadian Pacific Railway and the Kennebec Highway. A majority of these persons are farmers, woodsmen, and other laboring classes, although a few aliens of other nationalities arrive here. The arrangement between the Immigration Service and the Public Health Service officer, through which the immigration inspector notifies the medical officer whenever an arriving alien requires medical examination, continued throughout the year and seems to be satisfactory, as it facilitates the work of both services and is of great convenience to those traveling by highway.

KEY WEST, FLA.

Acting Asst. Surg. J. Y. Porter, jr., in charge. Post-office and telegraphic address, Key West, Fla.

Immigration arriving at his port has increased each year since 1925. The class of alien is, as a rule, high, the vast majority being from Cuba, with a small number from Central America and the Cayman Islands. During the fiscal year 1929, 200 vessels and aircraft were boarded for immigration medical inspections. Since the inauguration of airplane service to this port the work of the medical officer has increased considerably.

LEWISTON, N. Y.

Acting Asst. Surg. Richard H. Sherwood in charge. Post-office and telegraphic address, Lewiston, N. Y.

Aliens arrive at Lewiston via boat from Toronto or motor from Canada via the Queenston-Lewiston bridge. There is comparatively little foot traffic over the bridge, and much of the street car passenger traffic originates in Niagara Falls, N. Y. Most of the persons passing through this port are tourists, excursionists, and commuters. On the whole the physical condition of these people is good. A great many persons entering illegally are apprehended by the immigration authorities and are deported. The total number of aliens medically examined during the year was 48,788.

MONTREAL, CANADA

Surg. G. M. Corput in charge. Post-office and telegraphic address, Montreal, Canada.

During the year 19,189 immigrants were given a medical examination upon arrival at this port. This represents only a small portion of the aliens passing through the immigration office, because many are passed by the inspectors without being referred for medical examination. The aliens so passed without medical examination are

usually business men who make periodic trips to the United States. The type of immigrant as a whole is very good, and of the total examined only 1,118 were certified for disease or defect.

During the past year the medical officer of the Public Health Service attached to the United States immigration station at Montreal, in connection with the medical examination of intending immigrants, was also detailed as technical adviser to the American consul at this port.

NACO, ARIZ.

Acting Asst. Surg. B. C. Tarbell in charge. Post-office and telegraphic address, Naco, Ariz.

The aliens encountered at this port are mostly of Mexican extraction, being of the laboring class and entering for business, pleasure, and in transit. There are also presented by the authorities at this station for medical examination those aliens against whom deportation proceedings have been instituted. In addition, aliens applying to a near-by American consul in Mexico for immigration visas are given a prior medical immigration examination. Over 1,500 refugees were permitted temporary stay during the Mexican revolution and later were returned to Mexico. The majority of these persons were given a medical examination and 679 vaccinations were performed. The majority of alien passengers arrive at this port by automobile. During the year an average of slightly over 9,000 automobiles entered at this port each month. Some also come by train from Cananea and Nogales, Sonora, Mexico, which arrives three times a week. There is also an automobile stage service from Cananea and Agua Prieta, Sonora, Mexico, which arrives daily. Inspection is maintained for 24 hours each day, but only United States citizens and aliens previously lawfully admitted are allowed to enter the port from 5 p. m. to 9 a. m.

NEW BEDFORD, MASS.

Acting Asst. Surg. E. F. Cody in charge. Post-office and telegraphic address, 105 South Sixth Street, New Bedford, Mass.

There has been a decrease in immigration at this station during the past fiscal year. This has been due to a number of causes, the principal one being the delay in establishing a vice consul at St. Vincent, Cape Verde Islands, from which the majority of immigrants arrive, has caused many intending immigrants to defer their endeavor to enter this country. However, it is believed that passenger traffic between these islands and this port soon will become stabilized, as a company has recently been incorporated for the purpose of controlling three sailing vessels with the contemplated addition of a steamship. The immigration laws at this port have been rigidly enforced during the past year, with the result that a well-established alien smuggling system, which is said to have been active for some 30 years, has been uncovered, which has resulted in seizures and sales of vessels, imprisonments, and deportations.

During the fiscal year but one vessel arrived from a foreign port carrying passengers; these numbered 86 and were given the required medical immigration examination.

NEWPORT, VT.

Acting Asst. Surg. J. F. Blanchard in charge. Post-office and telegraphic address, Newport, Vt.

This station is located 8 miles from the Canadian border, at the convergence of the principal highways crossing it and at the junction of the Canadian Pacific and the Quebec Central Railways. During the summer months a passenger steamer is in operation on Lake Memphremagog bringing passengers from Canadian ports to Newport. During the automobile season, lasting about nine months, a large percentage of the aliens arrive by highway, reaching this port at all hours of the day, necessitating the services of the medical examiner at all hours. In addition to making medical examinations of aliens passing through this port, the medical officer provided medical attention to aliens in the county jail awaiting deportation. During the past fiscal year 2,708 aliens were medically examined, about 5 per cent of whom were certified for some mental or physical defect.

NIAGARA FALLS, N. Y.

Acting Asst. Surg. Raymond Hensel in charge. Post-office and telegraphic address, Niagara Falls, N. Y.

A large percentage of aliens applying for admission at this port are of British extraction. However, most of the other European races are represented in small numbers. Among those applying for admission are persons who were unable to obtain visas in their native country and so came to Canada with the hope of entering via the border ports.

There are two international highway bridges, about 1½ miles apart, which serve as points of entry. There is also maintained at the railroad station quarters to take care of the medical examination of arriving aliens. The total number of aliens entering this port during the past year was 1,884,575, a great many of whom were transient visitors.

NORTHPORT, WASH.

Acting Asst. Surg. I. A. Nelson in charge. Post-office and telegraphic address, Northport, Wash.

On November 1, 1929, the port of entry for persons crossing the border in this section was transferred from Marcus, Wash., to Northport, Wash. On this date an officer of the Public Health Service was detailed for duty at the United States immigration station for the medical examination of arriving aliens.

Immigration arrives at this port by train, on foot, and by automobile. The practice in force since the opening of this port whereby the immigration inspector notifies the medical officer whenever an arriving alien requires medical examination seems to be satisfactory, as it facilitates the work of both services.

NOYES, MINN.

Acting Asst. Surg. Frank B. McIntosh in charge. Post-office and telegraphic address, Noyes, Minn.

The port of Noyes is situated on the international boundary line between Canada and the United States and almost on the interstate

border between Minnesota and North Dakota. It is a port of considerable importance from an immigration standpoint. During the past fiscal year 124,973 persons passed through this port. Of this number, 51,268 were aliens entering the United States, of whom 435 were seeking permanent homes.

A great percentage of the people passing through Noyes are of the tourist class, entering by motor for a short stay only, or business people entering for reasons related to their various vocations. Many of these are of a high class. Another group apparently desires admission for the purpose of proceeding to the Mayo clinic at Rochester, Minn., and other medical centers for treatment.

A considerable number of the persons entering at this port for permanent residence in the United States are composed of the laboring classes desiring to go to the great industrial centers, such as Chicago and Detroit, in the hope of finding employment there. There is always present here the problem of immigrants from Europe who have either been unable to obtain visas in their native country and have sailed for Canada hoping to effect entry into the United States via the international border. These persons, however, are usually either halted at the immigration office or are apprehended by the border patrol.

OGDENSBURG, N. Y.

Acting Asst. Surg. R. L. Stacy in charge. Post-office and telegraphic address, Ogdensburg, N. Y.

The great majority of aliens entering through the port of Ogdensburg were either farmers or laborers, coming chiefly from Canada, England, Ireland, Scotland, and Holland. Only those aliens who were referred by the immigration authorities were medically examined, the majority of these examinations being made at the immigration office. Practically all of the arriving foreign seamen were examined on shipboard.

PHILADELPHIA, PA.

Surg. D. J. Prather in charge. Post-office and telegraphic address, Marcus Hook, Pa.

The routine inspection of aliens, both crews and passengers arriving from foreign ports, is made at the quarantine station at Marcus Hook, Pa., in conjunction with quarantine inspections. Aliens on vessels which do not have to stop at quarantine are medically examined at the wharf upon arrival at Philadelphia, Chester, and Wilmington. A medical officer is also on duty at the office of the Immigration Service in Philadelphia who furnishes medical services to cases in that office; also a medical officer is detailed to the immigration station at Gloucester, N. J., for the purpose of making medical examinations and furnishing medical treatment.

During the year 32,052 crew, 72 stowaways, and 363 passengers were medically examined under the immigration laws.

PHILIPPINE ISLANDS

Surg. R. W. Hart in charge. Post-office and telegraphic address, P. O. Box 424, customhouse, Manila, P. I.

The United States immigration laws and regulations, in a somewhat modified form, are in force in the Philippine Islands. The collectors

of customs act as immigration officers and are charged with the enforcement of the laws and regulations concerning immigration. The medical examination is made by medical officers of the United States Public Health Service. Medical inspection of arriving aliens is available at Manila, Cebu, Iloilo, Legaspi, Zamboanga, Jolo, and Davao. Similar arrangements have also been made at Cavite and Olongapo should any aliens arrive requiring such examination; but, owing to the fact that passenger vessels have not been calling at these two ports, the officers there are seldom called upon to make such examinations. The medical examinations are made on board the arriving vessels. Intensive medical examinations are made in the quarantine office, as no special facilities exist for the detention and intensive medical examination of arriving aliens.

All laboratory work incident to the medical examination of arriving aliens was performed by service officers. Aliens arrive on practically every passenger vessel, so that medical immigration examinations are almost continuous. During the year, 20,932 alien passengers were inspected, and of this number 178 were certified for disease or defect.

PORT HURON, MICH.

Acting Asst. Surg. George M. Kesi in charge. Post-office and telegraphic address, Port Huron, Mich.

During the fiscal year ended June 30, 1929, 452,675 aliens entered the United States at Port Huron. Of these, 2,750 signified an intention of seeking permanent homes.

The general type of alien applying for admission at this port was very good, approximately 75 per cent being natives of Canada. The examinations were carried on at the St. Clair Tunnel railroad station, at the ferry wharf, and at the Public Health Service office in the Federal building. In addition to making medical examinations of aliens passing through this port, the medical officer provided medical attention for the aliens in the county jail awaiting deportation.

PORTLAND, OREG.

Asst. Surg. F. S. Fellows in charge. Post-office and telegraphic address, Portland, Oreg.

As there are no direct passenger liners coming to this port, the medical immigration work consists almost exclusively of the medical examination of alien seamen. During the year, 1,378 alien seamen were medically examined, this work being done on shipboard.

PORTO RICO

Surg. L. E. Hooper in charge. Post-office and telegraphic address, San Juan, Porto Rico.

The routine medical examination of aliens arriving in Porto Rico is done aboard the vessels in conjunction with the quarantine inspection. Suspicious or doubtful cases are sent to the Public Health Service office for further examination.

The majority of the immigrants to Porto Rico come from the other islands in the West Indies and from Central or South America. A few come from European countries. The type is generally good, many of them traveling first class.

At San Juan, 7,177 alien passengers and 17,918 alien seamen were medically examined during the year, and a total of 396 alien passengers and 10,379 alien seamen were medically examined at the nine subports in Porto Rico.

PORT SAN LUIS, CALIF.

Acting Asst. Surg. T. S. Long in charge. Post-office and telegraphic address, Port San Luis, Calif.

During the past fiscal year only 89 alien seamen arrived at this port and all were medically examined. These came from New Zealand on English and Norwegian ships and all were in good physical condition. No passengers arrived on any of these ships.

PRESIDIO, TEX.

Acting Asst. Surg. C. M. Hatcher in charge. Post-office and telegraphic address, Presidio, Tex.

The medical immigration operations and the quarantine activities at this station are conducted in the same building. The general type of immigrant examined here is of the laboring class. Most of the immigrants locate on near-by farms; some go to the mines in this vicinity, and a very few go into the interior of the United States. Practically all are Mexicans.

During the past fiscal year 17,621 aliens entered this port and 1,378 were medically examined; 292 of this number were bona fide immigrants seeking permanent homes. The hours of duty at this station are from 7 a. m. until 11 p. m.

PROVIDENCE, R. I.

Surg. H. G. Ebert in charge. Post-office and telegraphic address, room 403, Federal building, Providence, R. I.

Most of the aliens arriving at this port originate in countries bordering on the Mediterranean Sea: Portugal, Italy, Africa, Egypt, Palestine, Turkey, Greece and Armenia, and Russia and Rumania on the Black Sea. The remainder are divided among the Azores group of islands, the Cape Verde Islands and the Madeira Islands. These aliens may be grouped as follows: Resident aliens with return permits; original entries, quota or nonquota; aliens in transit or coming for temporary visits or on business trips; and a few diplomatic representatives of other nations. There has been noted at this port a continuous improvement in the physical and mental condition of aliens applying for admission to the United States.

The total number of aliens medically examined at this port during the year was 9,824, divided as follows: 3,388 passengers not examined abroad, 122 passengers examined abroad and reexamined upon arrival, and 5,314 members of crews. Of those who were not medically examined abroad, 66 were certified upon arrival. Of those who had been examined abroad prior to embarkation, 22 were certified abroad and recertified upon arrival. These certifications were all for minor conditions. No serious condition was found at any time among those who had been medically examined abroad prior to being granted visas.

QUEBEC, CANADA

Acting Asst. Surg. J. L. Gilbert in charge. Post-office and telegraphic address, Quebec, Canada.

The immigration station is located in the Canadian Government Immigration Building on the Government docks at Quebec. There is an average of five to seven vessels arriving each week. The medical examination of alien cabin passengers destined for the United States is performed aboard ship; the medical examination of alien steerage passengers destined for the United States is conducted in the building on the dock. During the past fiscal year 8,212 immigrants were medically examined. Of this number, 6,364 arrived by steamship from Europe, and 1,848 from Canada sought entry.

RIO GRANDE, TEX.

Acting Asst. Surg. C. J. Martin in charge. Post-office and telegraphic address, Rio Grande, Tex.

This office is located on the banks of the Rio Grande River on the United States military reservation, Fort Ringgold, Tex., about 1 mile from the town of Rio Grande City. Comargo, a railroad town with a population of 3,000, situated approximately 5 miles from the river, is the nearest Mexican center. Traffic between Comargo and this port is by automobiles, crossing the river on ferry boats which make as many trips a day as are necessary. The number of these trips varies but averages about 500 a month. The number of aliens entering during the fiscal year was 5,766, of whom 230 were bona fide immigrants seeking permanent homes and the remainder were temporary entrants. All are required to undergo an intensive medical examination.

The aliens presented for examination are almost exclusively Mexicans, being in the main part from the working classes, although some, especially the bona fide immigrants, come from higher ranks of society. Those seeking permanent homes in the United States usually locate near the border, seldom going more than two or three hundred miles from the immediate vicinity of Rio Grande City.

ROUSES POINT, N. Y.

Acting Asst. Surg. J. L. Remillard in charge. Post-office and telegraphic address, Rouses Point, N. Y.

This station is situated about 2 miles south of the Canadian boundary line. The aliens arrive by railroad, highway, and aircraft, Canadians being the most numerous. There are also a great many from southern European countries and a fair portion from eastern Europe. It is necessary that the medical officer be present upon the arrival of all trains in order to examine medically any alien who might be removed by the immigration officers for medical examination.

ST. JOHN, NEW BRUNSWICK

Acting Asst. Surg. D. C. Malcolm in charge. Post-office and telegraphic address, St. John, New Brunswick, Canada.

The port of St. John is open all the year, but most of its operations are carried on during the winter months, from November until April,

during which period the ports of Montreal and Quebec are icebound. The type of immigrant arriving at this port is very good, aliens from the British Isles and Scandinavia predominating. During the year 38 vessels of the Canadian Pacific Line arrived carrying alien passengers.

SAULT STE. MARIE, MICH.

Acting Asst. Surg. C. Willison in charge. Post-office and telegraphic address, Sault Ste. Marie, Mich.

Aliens arrive at this station by the Canadian Pacific Railroad and by the ferry operating on the Sault Ste. Marie River. The trains enter by bridge and aliens are medically examined at the depot which is located about three-fourths of a mile from the Federal building. Aliens entering by ferry are taken to the Federal building, where they are examined by the medical officer.

The aliens examined at this port are wholly Caucasian, over 80 per cent being natives of Canada and the remainder being principally Europeans. The greater number are destined to the large automobile centers to seek work. The total number of alien passengers medically examined during the year was 210.

SCOBEY, MONT.

Acting Asst. Surg. T. M. Morrow in charge. Post-office and telegraphic address, Scobey, Mont.

Practically all aliens medically examined at this port are Canadian farmers, with an occasional European immigrant. During the year 7,247 aliens entered this port; but 8 of this number were referred to the medical officer by the immigration authorities for examination.

SAN DIEGO, CALIF.

Asst. Surg. G. T. Sprague in charge. Post-office address, Point Loma, Calif.; telegraphic address, San Diego, Calif.

The greater part of the medical immigration examinations at this port is done aboard arriving vessels at Point Loma, in conjunction with quarantine inspection. All vessels arriving from foreign ports are boarded, and all aliens are medically examined. Those requiring a more extensive examination than is practicable to make at quarantine are referred to the Public Health Service office in San Diego for further examination. The majority of the larger vessels are inter-coastal from New York, and pick up aliens from South America, Panama, and the West Indies en route. Practically all nationalities are represented in the passengers, but they are generally the better type of alien. There have been several Scandinavian vessels touching port here, and a few French and British, the majority of aliens on board being en route to San Francisco. A large proportion of the alien seamen encountered are the local fishermen who fish in Mexican waters. These are practically all residents of San Diego; although not citizens, the majority being Portuguese and having touched at Mexican ports, they are included in the examination as aliens upon each return to San Diego.

The Public Health Service officer on duty at this port also makes examinations of aliens taken in custody by the immigration service in deportation proceedings.

During the year 1,479 alien passengers were medically examined, 20 of this number being certified for disease or defect; 6,761 alien crew were medically examined and none was certified.

Medical examination of aliens is also made by officers attached to this station at the Mexican border port of entry, San Ysidro. The great majority of aliens entering at the port of San Ysidro are Mexicans. There are also considerable numbers of Russians, Armenians, Syrians, and a few Canadians. Some Japanese and Chinese are admitted for temporary stay, chiefly that they may receive medical attention in the United States.

During the year 1,483 passengers were medically examined at San Ysidro.

SAN FRANCISCO, CALIF.

Surg. Dunlop Moore in charge. Post-office and telegraphic address, Angel Island, Calif.

The activities of the Public Health Service at this station may be described under the following headings: (1) Medical examination of aliens; (2) hospital; (3) laboratory; (4) miscellaneous.

Medical examination of aliens.—Chiefly as a result of restrictive legislation, the number of Chinese and Japanese applicants for admission at this port has shown a marked decrease in recent years. The primary medical examination of arriving alien passengers and members of crews has been conducted on board ship at quarantine. All secondary medical examinations and all intensive medical examinations are conducted at the Angel Island immigration station.

Under existing statutes, Filipinos, though not American citizens, are exempt from the required immigration examinations to which other aliens are subject. During the past year on many vessels transporting this class of immigrant a high mortality has been noted, particularly the unusual incidence of meningococcus meningitis among the steerage class. With the approval and active aid of the local commissioner of immigration, the medical officer at this station has been cooperating with the medical director of the district and the quarantine officer in carrying out the requirements of the regulations of the California State Board of Health relating to meningococcus meningitis. Frequent medical inspections have been made of these immigrants and others detained in custody at the immigration station—often 200 or more in number. Nasopharyngeal cultures have been made and examined in the Public Health Service laboratory; cases of suspicious illness, meningitis contacts, and meningococcus carriers have been isolated, at times burdening to the utmost the facilities of the small station hospital, with its limited staff. During the fiscal year nine cases of meningitis developed in the detention quarters, all in Chinese, and with one exception all males. The sick were promptly isolated and transferred to the San Francisco City Isolation Hospital. Of the 9 cases of meningitis, 5 appeared to have contracted the infection on shipboard prior to arrival; the remaining 4 cases may be ascribed to contact with carriers in the detention quarters.

During the fiscal year ended June 30, 1929, a total of 10,410 alien passengers and 14,471 alien members of crew were medically examined on arrival at this port.

Hospital.—As in former years the small immigration hospital at this port has been conducted by the Public Health Service for Immi-

gration Service of the Department of Labor. At the request of the quarantine officer and with the sanction of the Commissioner of Immigration, 122 meningitis contacts and 24 meningococcus carriers were admitted and isolated in the hospital, where 9 cases of meningococcus meningitis developed.

During the year a number of needed improvements in the hospital equipment have been made.

Laboratory.—The Chinese arriving at Pacific ports present perhaps more interesting pathological problems than any other class of aliens arriving at Pacific coast ports. Examination reveals in an extraordinary percentage of them retarded physical development often associated with subnormal hemoglobin count and eosinophilia. The average differential leucocyte count of 69 Chinese afflicted with uncinariasis—in most instances intestinal polyparasitism being demonstrable—was determined as follows: Polymorphonuclears, 51.78 per cent, monocytes, 6.16 per cent, lymphocytes, 29.46 per cent, eosinophils, 12.05 per cent, basophils, 0.55 per cent; average number of leucocytes counted, 389. Quite exceptionally in the hookworm cases the eosinophil count gave values within normal limits, a phenomenon sometimes difficult of explanation. From observations at this station it has been found that very low eosinophil counts in uncinariasis are almost always a temporary condition usually associated with intercurrent coccus infections, e. g., meningitis and pneumonia, etc.; the antecedent eosinophilia invariably reappears during convalescence from the bacterial disease. The basophil percentage given above corresponds quite closely to the results (0.45) per cent obtained by a recent investigator (Alder) working with the blood of normal Europeans.

Malarial infection, tertian, estivo-autumnal, and quartan, often latent and afebrile, is found in a considerable percentage of arriving Chinese. This is not surprising in view of the fact that the Province from which the great majority of Chinese emanate, Kwantung, lies directly under the Tropic of Cancer.

During the past year 2,777 specimens of feces were examined with special reference to helminthic ova and embryos. Seven hundred and sixty specimens gave negative results. In the remaining 2,017 specimens the presence of parasites was determined with the following frequency: *Trichuris trichiura*, 1,357; *Ascaris lumbricoides*, 1,151; hookworm, 879; *Clonorchis sinensis*, 334; *Fasciolopsis buski*, 33; *Metagonimus yokogawai*, 19; *Hymenolepis nana*, 12; *Strongyloides stercoralis*, 12; *Trichostrongylus orientalis*, 12; *Taenia saginata*, 2; *Oxyuris vermicularis*, 1.

Miscellaneous.—Under this heading may be noted the following duties: 951 medical treatments were administered to aliens and others suffering from minor ailments not requiring hospitalization; 92 aliens were vaccinated against smallpox; 67 applicants for admission to the United States were specially examined for the purpose of determining their approximate ages; in this connection it is necessary to consider the influence of parasitic disease in retarding physical development. Arrest cases numbering 1,038, members of crew, alleged citizens and transits (not classified as alien immigrants), were specially examined at time of admission to detention quarters for the purpose of preventing the introduction of communicable disease. Three cases of pediculosis pubis, 2 of pediculosis corporis, 2 of scabies, and 4 of gonorrhea were thus detected.

SAN PEDRO, CALIF.

Surg. H. A. Spencer in charge. Post-office and telegraphic address, 111 West Seventh Street, San Pedro, Calif.

The majority of alien passengers arriving at this port are from the Orient, Japanese being predominant. A relatively small percentage come from South and Central America and Mexico and a very few from western European ports; Norway and Sweden furnish the largest number of European passengers.

During the year, 7,615 alien passengers and 50,344 alien seamen were medically examined. These examinations are conducted on board ship, and those aliens suspected of having a certificable disease are reported to the immigration officer, who refers them to the office of the Public Health Service for further medical examination and disposition. Only a small number of the aliens arriving at this port have been given a medical examination abroad prior to being granted visas.

SASABE, ARIZ.

Acting Asst. Surg. John M. Hardy in charge. Post-office and telegraphic address, Sasabe, Ariz.

During the year 837 aliens were admitted at this station, of whom none was seeking permanent homes; the nearest American consul is located in Nogales, Sonora, Mexico, and after securing a visa such immigrants enter through the port of Nogales, Ariz. In general aliens admitted through Sasabe are Mexicans of the better classes, constituting merchants, ranchers, and mining men and their families from the northern part of Sonora, Mexico, entering for temporary stays to make purchases of supplies or for short visits with relatives in the United States. There were 134 alien residents of the United States readmitted upon their return from short stays in Mexico.

SUMAS, WASH.

Acting Asst. Surg. Eugene S. Clark, in charge. Post-office and telegraphic address, Sumas, Wash.

Aliens arrive at the port of Sumas by trains of the Canadian Pacific and Great Northern Railroad, which arrive twice daily, by auto stages and British Columbia electric trains, both of which make six trips daily, by privately owned automobiles, and by foot. While most of the aliens come direct from Canada, some arrive via Canada from other countries. These entries comprise all known occupations—farmers, laborers, skilled and unskilled mechanics, professional classes, and similar occupations. In addition, the medical officer is often called to make medical examinations of aliens who have gained a surreptitious entry into the United States and are apprehended by the border patrol.

TAMPA, FLA.

Surg. Frieuch Simpson in charge. Post-office and telegraphic address, 323 Lafayette-Arcade Building, Tampa, Fla.

There has been a decrease in the number of medical examinations made of arriving aliens at this port during the year. This was due to the fact that on November 1, 1928, arrangements were completed

whereby the conduct of the medical examinations of aliens arriving on vessels of the Peninsula & Occidental Line from Cuba which call at Key West prior to calling at Port Tampa, would be performed at the former place, both for those aliens destined to disembark at Key West and those destined to Port Tampa for disembarkation. This arrangement obviated the necessity of conducting any further medical examination of aliens on board the vessel at Port Tampa, and considerable time was thereby saved by the medical officer at this port, the alien and the steamship line. Aliens arriving direct at Port Tampa were, as formerly, subjected to a medical examination at quarantine.

THAYER (MERCEDES), TEX.

Acting Asst. Surg. R. H. Gray in charge. Post-office and telegraphic address, P. O. box 464, Mercedes, Tex.

This port has been open to traffic only since the opening of the new International Bridge on September 1, 1928. Since that date, 889 aliens have been registered by the immigration authorities, of whom only 16 were bona fide immigrants seeking permanent homes in the United States. All immigrants arriving were given an intensive medical examination.

VAN BUREN, ME.

Acting Asst. Surg. L. M. Albert in charge. Post-office and telegraphic address, Van Buren, Me.

The immigrants entering at this port are for the most part Canadians of French descent; a few Canadians of the English race also come in through this port, but the number is very small. These aliens are of good sanitary type and comparatively few diseases or defects are encountered.

VICTORIA, BRITISH COLUMBIA

Acting Asst. Surg. C. D. Holmes in charge. Post-office and telegraphic address, Victoria, British Columbia.

The type of aliens now seeking to enter the United States has improved considerably in recent years. This is probably due to the influence of the quota law, and as a rule only those aliens who believe themselves eligible in every respect attempt to enter. These aliens are for the most part Canadian, English, and Scotch. The alien crews medically examined at this port are practically all from vessels of the Canadian Pacific Line, which ply between this port and Seattle and are found to be in very good condition physically and mentally.

WINNIPEG, MANITOBA, CANADA

Acting Asst. Surg. George B. Story in charge. Post-office and telegraphic address, Winnipeg, Manitoba, Canada.

During the year 22,416 persons applied for admission to the United States through the port of Winnipeg, of whom 8,928 were referred for medical examination. As compared with the number of applicants for admission to the United States during the preceding year, there was a decrease of 876, which may be accounted for by a combination of factors. With the passing of the first decade of postwar depression,

there has followed a revival of business and industries, which, with the development of the natural resources, has furnished a great number of opportunities and created a demand for employment in many different lines.

There has been a steady improvement in the type of immigrants presenting themselves for permanent entry into the United States; and while originating in the same countries as heretofore, the individual type is of a much higher standard, due in part to the fact that prospective immigrants are becoming better informed and thus acquainted with the futility of making application for admission unless they possess the necessary qualifications. This improvement is also due in part to the fact that the Canadian Government is restricting the entrance into Canada of immigrants from Central Europe, especially those of the class which has formerly found it convenient to reside in Canada temporarily while awaiting an opportunity of making permanent entry into the United States.

On February 23, 1929, the building at 258½ Portage Avenue, in which the Public Health Service and the Immigration Service had maintained offices since 1920, was destroyed by fire. The station property and records, though damaged by smoke and water, are serviceable. A new location was secured at once and the medical examinations were performed without interruption. The present space allotted is on the second floor of the Trust & Loan Building at 173 Portage Avenue East, and consists of a well-lighted room which meets the present needs in a very satisfactory manner. Under the present practice all applicants for permanent entry must apply directly to the consulate, and as a result approximately 90 per cent of the required medical examinations are conducted on behalf of the consulate general's office.

YARMOUTH, NOVA SCOTIA

Acting Asst. Surg. H. C. M. DeWolfe in charge. Post-office and telegraphic address, Yarmouth, Nova Scotia.

The medical examination of arriving immigrants at this port is limited to the intensive examination of all aliens intending to reside permanently in the United States and of such other aliens as may be specifically presented by the immigration officers for examination.

The type of alien applying for admission at this port is very good. As a result of the medical examinations very few defects or diseases are found and very few aliens are mandatorily excluded. During the year 2,895 aliens applied for admission to the United States at this port.

DIVISION OF SANITARY REPORTS AND STATISTICS

In charge of Asst. Surg. Gen. R. C. WILLIAMS

The outstanding feature of the fiscal year ended June 30, 1929 from a health standpoint, was the nation-wide epidemic of influenza which began in October on the Pacific coast, spread rapidly eastward, reached its peak about the first of the year 1929, and continued with diminishing force in some sections until spring.

In most localities the epidemic lasted only a few weeks, and in many parts of the West it had subsided before it was reported in epidemic form in the Northeastern States.

The disease was less severe in form than the influenza of the pandemic of 1918. Many cases were not seen by physicians, and some cases were so mild that the diagnosis was difficult. Still the epidemic caused relatively high death rates during the later months of 1928 and the winter of 1929.

In Europe the disease appeared later than it did in the United States, and generally it affected the British Isles and the western countries of Europe more severely than it did the eastern portions.

MORBIDITY AND MORTALITY REPORTS

The division of sanitary reports and statistics is a clearing house for information of the prevalence and geographic distribution of diseases dangerous to the public health. Reports are collected not only from the United States, but from all parts of the world, and these reports are compiled, analyzed, abstracted or tabulated, and published for the information of health officers and others engaged in public health work.

While the reports of the prevalence of communicable diseases are improving, there is still much to be desired, and the information received from the United States should be more reliable and much more nearly complete than it is at present. The establishment by the Public Health Service of a registration area for diseases dangerous to the public health would aid greatly in securing prompt and accurate information, which is needed not only for the protection of the people of the United States but to enable the Public Health Service to comply fully and promptly with the provisions of international sanitary conventions requiring reciprocal notification of first cases of certain diseases, the progress of epidemics, and other information.

CURRENT MONTHLY MORTALITY STATISTICS

Until the last few years current reports of deaths in the United States have been available only for cities and for a few States which issue their own publications.

During the fiscal year ended June 30, 1928, the collection and compilation of data showing the number of deaths each month by causes was begun by the Public Health Service. At the close of that

fiscal year reports from 13 States were being published. One year later, in July, 1929, 23 States were included in the reports, as follows:

Alabama.	Kansas.	Nebraska.	South Carolina.
California.	Kentucky.	New Jersey.	South Dakota.
Connecticut.	Louisiana.	New York.	Tennessee.
Hawaii.	Michigan.	North Carolina.	Virginia.
Indiana.	Minnesota.	Pennsylvania.	Wisconsin.
Iowa.	Mississippi.	Rhode Island.	

The statistics are published in the Public Health Reports and include death rates, by months, for all causes and for the principal diseases and classes of diseases and also the infant mortality rates. Comparisons are made with the corresponding month of the preceding years. Annual rates, comparing the death rates for the years 1923 to 1928, were published early in May, 1929.

It is thought that the current publication of these data is of considerable value to health authorities and others concerned.

COLLABORATING AND ASSISTANT COLLABORATING EPIDEMIOLOGISTS

The Public Health Service is obliged to depend largely upon State and local health officers for its information relative to the prevalence of disease in the United States. In order to secure as full reports as possible and to encourage the States to improve the facilities and methods for collecting morbidity data, officers of State, city, and county health departments have been appointed as officers of the Public Health Service, with the titles of collaborating epidemiologist (in State health departments) and assistant collaborating epidemiologist (in local health departments). At the end of the fiscal year these appointments were in force in 44 States and one possession.

The following table shows the States in which these officers were acting at the close of the fiscal year and the number of officers in each State:

Collaborating and assistant collaborating epidemiologists as of June 30, 1929

State or possession	Collaborating epidemiologists	Assistant collaborating epidemiologists	State or possession	Collaborating epidemiologists	Assistant collaborating epidemiologists
Alabama.....	1	54	Nebraska.....	1	96
Arizona.....	1	50	New Jersey.....	1	0
Arkansas.....	1	223	New Mexico.....	0	27
California.....	1	256	New York.....	0	1
Colorado.....	1	184	North Carolina.....	1	111
Connecticut.....	1	0	North Dakota.....	1	87
Delaware.....	1	2	Ohio.....	1	170
Florida.....	1	9	Oklahoma.....	1	75
Georgia.....	1	39	Oregon.....	1	102
Idaho.....	1	9	Porto Rico.....	1	3
Illinois.....	1	108	South Carolina.....	1	14
Indiana.....	1	522	South Dakota.....	1	63
Iowa.....	1	315	Tennessee.....	1	73
Kansas.....	1	117	Texas.....	1	323
Kentucky.....	1	133	Utah.....	1	36
Louisiana.....	1	42	Vermont.....	1	10
Maine.....	1	475	Virginia.....	1	33
Maryland.....	1	72	Washington.....	1	53
Massachusetts.....	1	0	West Virginia.....	1	76
Michigan.....	1	5	Wisconsin.....	1	237
Minnesota.....	1	1	Wyoming.....	1	33
Mississippi.....	1	76			
Missouri.....	1	119			
Montana.....	1	95	Total.....	43	4,529

WEEKLY TELEGRAPHIC REPORTS

The earliest regular morbidity reports received by the Public Health Service are the weekly telegraphic reports of cases of communicable diseases made during the fiscal year by the health departments of all of the States except Nevada. The telegrams show for each week the numbers of cases of diphtheria, influenza, measles, meningococcus meningitis, poliomyelitis, scarlet fever, smallpox, and typhoid fever. The data are tabulated immediately and sent to the State health officers. The figures are also published in the Public Health Reports.

A few of the States are not able to give the information for all of the diseases, but there has been improvement during the year in the reports and in the regularity with which they have been received.

Although these reports are not so nearly complete as are the monthly and annual reports, they are valuable as furnishing an index of current health conditions.

CURRENT SUMMARIES

Current summaries of the prevalence of the principal communicable diseases in the United States covering periods of four or five weeks were published in the Public Health Reports during the fiscal year. These summaries show the trends of the different diseases and bring to the reader's attention details which might be overlooked in examining the tables.

MONTHLY STATE REPORTS

During the fiscal year data were published monthly from all of the States except New Mexico, Nevada, Texas, and Utah. These reports include statistics for all the diseases which are notifiable. The list of notifiable diseases is not the same in the different States. The reports for most of the States give the information by counties or other geographical subdivisions.

ANNUAL STATE MORBIDITY REPORTS

The annual State reports, showing the prevalence of communicable diseases in the several States by months, are most used for statistical purposes. They also give the number of deaths registered in each State for each disease. For the year 1927 data were published for all of the States except Utah. The District of Columbia, Territory of Hawaii, and the Philippine Islands were also included.

CITY REPORTS

During the fiscal year reports of the number of cases of the principal communicable diseases were received weekly from 556 cities of over 10,000 population in the United States. The reports also included the deaths from these diseases and the total number of deaths from all causes.

The reports from 121 of these cities are published in the Public Health Reports, with rates and comparisons with figures for preceding years. The following named diseases are included:

Chicken pox.	Pneumonia (all forms).
Dengue.	Rabies in man.
Diphtheria.	Rabies in animals.
Influenza.	Scarlet fever.
Lethargic encephalitis.	Smallpox.
Measles.	Tuberculosis (all forms).
Meningococcus meningitis.	Typhoid fever.
Mumps.	Typhus fever.
Pellagra.	Whooping cough.
Poliomyelitis.	

Two annual summaries of reports from cities were prepared and published during the fiscal year, one including cities of over 100,000 population and the other for cities of from 10,000 to 100,000 population.

The following table shows the number of cities in each State which reported to the Public Health Service:

City reports, fiscal year 1929

	Number of cities		Number of cities
Alabama	9	Nevada	1
Arizona	0	New Hampshire	8
Arkansas	5	New Jersey	34
California	23	New Mexico	1
Colorado	5	New York	36
Connecticut	13	North Carolina	6
Delaware	1	North Dakota	2
District of Columbia	1	Ohio	39
Florida	4	Oklahoma	3
Georgia	9	Oregon	2
Idaho	1	Pennsylvania	50
Illinois	30	Rhode Island	10
Indiana	29	South Carolina	3
Iowa	14	South Dakota	2
Kansas	11	Tennessee	5
Kentucky	5	Texas	16
Louisiana	4	Utah	2
Maine	8	Vermont	2
Maryland	3	Virginia	11
Massachusetts	61	Washington	7
Michigan	22	West Virginia	9
Minnesota	13	Wisconsin	19
Mississippi	0	Wyoming	1
Missouri	8		
Montana	5	Total	556
Nebraska	3		

INSANE, FEEBLE-MINDED, AND EPILEPTIC

Monthly reports from hospitals for the care of the insane were received during the fiscal year. These reports include the numbers of new admissions by sex and psychosis, the total number of patients in the hospitals, and the number on parole at the end of each month.

Reports were received from institutions located in 36 States. A few private hospitals are included, but most of the institutions reporting are under Federal or State control.

Some hospitals have been unable to supply the data monthly, but an effort is being made to increase the number of institutions from which reports are received.

Reports for the States of Connecticut, Illinois, Indiana, Maryland, and Ohio were received from the central State agency having charge of the institutions. In other States the reports are prepared by the individual hospitals.

Reports were received from institutions for the care of the feeble-minded located in 23 States. These reports include the number of admissions, discharges, deaths, and the number of patients in the institutions and on temporary leave, by sex.

Institutions for the care and treatment of epileptics located in 11 States reported monthly. The items included in these reports were the same as those given for institutions for the feeble-minded.

The data received from the various institutions are compiled and analyzed for publication from time to time in Public Health Reports.

INTERNATIONAL EXCHANGE OF SANITARY INFORMATION

Radical changes are taking place in the international reporting of diseases dangerous to the public health. The International Sanitary Convention of June 22, 1926, and the Pan American Sanitary Code, signed at Habana, November 14, 1924, have not only imposed obligations on this country but they have made it possible for the United States to secure much more satisfactory reports of the prevalence of disease in other countries than could be obtained before these conventions were in effect.

In accordance with the terms of these international agreements, information of the prevalence of communicable diseases and notice of the presence of the quarantinable diseases have been sent to the International Office of Public Hygiene, the Pan American Sanitary Bureau, and, through the Department of State, to foreign governments.

FOREIGN REPORTS

For more than 50 years the Public Health Service has been receiving reports of the prevalence of quarantinable diseases in foreign countries from consular officers of the United States. This duty was imposed on consuls by the law of April 29, 1878. The act of February 15, 1893, provided for regular weekly sanitary reports from the consular officers, and these regular reports have been received by the Public Health Service for more than 36 years.

These reports are incomplete, especially when coming from undeveloped countries where morbidity and mortality statistics are not available, but many countries have made rapid advances in the recording of vital statistics during the last few years, and the reports are now of much more value than they have been in the past, and the improvement is continuing.

The reports from consular officers usually cover the consular district, which includes the territory immediately surrounding the port. Most of the principal ports of the world are included in these reports.

The International Office of Public Hygiene and the health section of the League of Nations collect information as to sanitary conditions, especially the prevalence of communicable diseases, from nearly all parts of the world, and their telegrams, notices, and publications have been of great assistance to the Public Health Service by giving warning of the presence of diseases which might be introduced into the United States.

The Pan American Sanitary Bureau has been of great assistance by keeping the Public Health Service informed of conditions in other countries in this hemisphere.

Valuable information is also received from officers of the Public Health Service stationed abroad.

PREVALENCE OF DISEASE

Yellow fever was not reported in the United States or its possessions during the fiscal year ended June 30, 1929. Cholera appeared in the Philippine Islands during the summer of 1928.

Two cases of plague were reported in California during July and August, 1928, the source of infection being ground squirrels. Plague was also present during the fiscal year in the district of Hamakua, island of Hawaii.

The following table gives a comparison of the number of cases of the principal communicable diseases and deaths from these diseases for the years 1926, 1927, and 1928. Some of the reports for 1928 had not been received when the table was prepared, but it includes all States for which reports for the three years were available.

CASES

Disease	Number of States ¹	Aggregate population (in thousands)			Cases			Cases per 100,000 population		
		1926	1927	1928	1926	1927	1928	1926	1927	1928
Chicken pox.....	40	106, 145	107, 531	108, 805	171, 885	198, 883	188, 217	161.9	185.0	173.0
Diphtheria.....	43	110, 821	112, 241	113, 550	89, 951	101, 783	87, 853	81.2	90.7	77.4
Influenza.....	43	110, 821	112, 241	113, 550	-----	-----	-----	-----	-----	-----
Malaria.....	43	110, 821	112, 241	113, 550	-----	-----	-----	-----	-----	-----
Measles.....	42	110, 126	111, 527	113, 001	645, 689	433, 452	530, 067	586.3	388.7	469.1
Meningococcus meningitis.....	28	75, 451	76, 461	77, 340	1, 770	2, 263	4, 146	2.3	3.0	5.4
Mumps.....	33	91, 641	92, 806	93, 850	59, 431	113, 103	123, 128	64.9	121.9	131.2
Pellagra.....	43	110, 821	112, 241	113, 550	-----	-----	-----	-----	-----	-----
Pneumonia (all forms).....	41	106, 102	107, 465	108, 714	-----	-----	-----	-----	-----	-----
Poliomyelitis.....	36	93, 643	94, 873	95, 981	2, 438	8, 933	4, 405	2.6	9.4	4.6
Scarlet fever.....	43	110, 821	112, 241	113, 550	188, 843	203, 551	168, 982	170.4	181.4	148.8
Smallpox.....	43	110, 821	112, 241	113, 550	32, 378	34, 671	38, 092	29.2	30.9	33.5
Tuberculosis (all forms).....	42	110, 744	112, 164	113, 473	-----	-----	-----	-----	-----	-----
Tuberculosis (respiratory system).....	39	103, 611	104, 918	106, 110	-----	-----	-----	-----	-----	-----
Typhoid fever.....	43	110, 821	112, 241	113, 550	38, 443	31, 622	24, 923	34.7	28.2	21.9
Whooping cough.....	43	110, 821	112, 241	113, 550	187, 922	173, 038	153, 549	169.6	154.2	135.2

¹ In addition to the number of States given, the District of Columbia is included in all diseases except mumps.

DEATHS

Disease	Deaths			Deaths per 100,000 population			Cases reported for each death registered		
	1926	1927	1928	1926	1927	1928	1926	1927	1928
Chicken pox.....	116	145	126	0.1	0.1	0.1	1, 482	1, 372	1, 494
Diphtheria.....	7, 973	8, 504	8, 077	7.2	7.6	7.1	11	12	11
Influenza.....	42, 249	23, 831	48, 150	38.1	21.2	42.4	-----	-----	-----
Malaria.....	2, 694	2, 966	3, 709	2.4	2.6	3.3	-----	-----	-----
Measles.....	7, 499	4, 076	5, 273	6.8	3.7	4.7	86	106	101
Meningococcus meningitis.....	793	956	1, 824	1.1	1.3	2.4	2	2	2
Mumps.....	63	84	74	.1	.1	.1	943	1, 346	1, 664
Pellagra.....	4, 794	5, 823	6, 652	4.3	5.2	5.9	-----	-----	-----
Pneumonia (all forms).....	110, 496	87, 120	110, 536	104.1	81.1	101.7	-----	-----	-----
Poliomyelitis.....	750	1, 731	1, 162	.8	1.8	1.2	3	5	4
Scarlet fever.....	2, 603	2, 343	2, 129	2.3	2.1	1.9	73	87	79
Smallpox.....	370	165	134	.3	.1	.1	88	210	284
Tuberculosis (all forms).....	92, 242	86, 888	87, 863	83.3	77.5	77.4	-----	-----	-----
Tuberculosis (respiratory system).....	76, 649	72, 045	73, 474	74.0	68.7	69.2	-----	-----	-----
Typhoid fever.....	7, 741	6, 384	5, 425	7.0	5.7	4.8	5	5	5
Whooping cough.....	8, 920	7, 002	5, 666	8.0	6.2	5.0	21	25	27

Diphtheria.—In 1927 there was a reaction from the decline in the case and death rates from diphtheria which had been noted since 1921. However, the diphtheria rates for 1928 are the lowest which the Public Health Service has ever recorded.

Influenza.—During the last three months of the calendar year 1928 the epidemic of influenza swept eastward from the Pacific Coast, and at the close of the year it was about at its height, still increasing generally in the East and declining in the West. Many cases of influenza were not reported, but during October, November, and December, 1928, 686,000 cases of this disease were reported to the Public Health Service.

The disease was comparatively mild in form, and the proportion of fatal cases was much less than it was during the pandemic of 1918. Yet during the epidemic period the general death rates were high in most communities.

Measles.—During the calendar year 1928 more than half a million cases of measles were reported by 42 States. The reports are known to be incomplete.

Meningococcus meningitis.—This disease, also known as cerebrospinal fever and epidemic cerebrospinal meningitis, has been increasing in prevalence in the United States for several years, and the case and death rates for the year 1928 are higher than they have been since 1918. The steady increase in the rates during the last five years is shown in the following table:

Meningococcus meningitis case and death rates per 100,000 population

Year	Number of States included	Cases per 100,000 population	Deaths per 100,000 population	Year	Number of States included	Cases per 100,000 population	Deaths per 100,000 population
1924.....	22	1.9	0.8	1927.....	28	3.0	1.3
1925.....	22	1.9	.9	1928.....	28	5.4	2.4
1926.....	28	2.3	1.1				

This disease usually increases in prevalence during the winter months, reaching its maximum in the spring. During 1928 the greatest prevalence of the disease was in the Rocky Mountain States, but the Pacific and East North Central States reported high rates. The disease is present, however, in all parts of the United States. In general, the rates have been higher in the Northern than in the Southern States.

Although the percentage of increase in the number of cases of meningococcus meningitis has been high, the actual number of cases has not been large, as compared with the number of cases of the more common communicable diseases.

Pellagra.—Forty-three States reported 4,794 deaths from pellagra in 1926; 5,823 deaths in 1927; and 6,652 deaths in 1928. The death rates showed an increase over the preceding year of 20.9 per cent in 1927 and 13.4 per cent in 1928. The following table shows the increase in the pellagra death rates from 1924 to 1928, inclusive:

Pellagra death rates per 100,000 population

	Rate		Rate
1924-----	2. 5	1927-----	5. 2
1925-----	3. 6	1928-----	5. 9
1926-----	4. 3		

Pellagra is more prevalent in the rural districts than in the cities, and the rates for the Southern States are higher than those for the Northern States.

Pneumonia.—The pneumonia death rate for the calendar year 1928 was affected by the prevalence of influenza, although the highest pneumonia and influenza death rates were recorded after January 1, 1929.

The following table shows the pneumonia death rates per 100,000 population, based on reports to the Public Health Service, for the 5-year period 1924 to 1928, inclusive.

Pneumonia death rates per 100,000 population

Year	Number of States included	Deaths per 100,000	Year	Number of States included	Deaths per 100,000
1924-----	35	98. 6	1927-----	41	81. 1
1925-----	39	95. 4	1928-----	41	101. 7
1926-----	41	104. 1			

Poliomyelitis.—During the calendar year 1928, 4,405 cases of poliomyelitis (infantile paralysis) were reported to the Public Health Service by 36 States. As shown by the table, this is about half the number reported by these States for the year 1927 and almost twice the number reported for 1926. The geographic distribution of this disease is irregular. The highest case rates were recorded for the States of North Dakota, Washington, Maryland, Vermont, and West Virginia.

Rocky Mountain spotted fever.—One hundred and eighty-five cases of Rocky Mountain spotted (or tick) fever with 50 deaths were reported by nine States in 1928. In 1927, 219 cases and 46 deaths were reported by the same States.

Scarlet fever.—During 1928, 43 States reported 169,000 cases of scarlet fever, as compared with 203,500 cases for 1927 and 189,000 cases for 1926. The scarlet fever death rate in these States decreased from 2.1 per 100,000 in 1927 to 1.9 in 1928.

Smallpox.—In 43 States 38,000 cases of smallpox were reported in 1928, as compared with less than 35,000 cases in 1927. The disease was of the mild form, and these States reported only 134 deaths from smallpox in 1928. Final figures for many foreign countries are not yet available, but incomplete reports indicate that the United States will probably again have the undesirable distinction of reporting more cases of smallpox for the year than any other country in the world except British India.

Tuberculosis.—The tuberculosis death rate for 42 States in 1928 was 77.4 per 100,000 population. This is only slightly below the rate for the same States in 1927, but the rates for these two years are the lowest ever recorded by the Public Health Service, the 1927 rate being 7 per cent below the rate for 1926 for the same States.

The tuberculosis death rate in the United States has been declining for many years. The following table shows the death rates per 100,000 population as compiled by the Public Health Service from 1922 to 1928, inclusive:

Year	Number of States included	Tuberculosis death rate per 100,000	Year	Number of States included	Tuberculosis death rate per 100,000
1922.....	44	92.0	1926.....	42	83.3
1923.....	44	89.1	1927.....	42	77.5
1924.....	36	84.8	1928.....	42	77.4
1925.....	40	85.1			

Comparable figures for earlier years are not available, but in 1900 the death rate from tuberculosis in the registration area was 201.9 per 100,000. If the tuberculosis death rate of 1900 had prevailed in 1928 there would have been nearly 150,000 more deaths from tuberculosis in the United States than actually occurred.

Tularaemia.—Many cases of tularaemia are not reported. In 1928 481 cases, with 10 deaths, were reported to the Public Health Service. In 1927 the reports showed 218 cases and 13 deaths.

Typhoid fever.—Again a new low record for typhoid fever in the United States was established for the year 1928. Both the case rate and the death rate were the lowest ever recorded by the Public Health Service.

The typhoid fever case rate for 1928, computed on the reports from 43 States, was 22 per cent lower than the rate for 1927 and the typhoid fever death rate for these States was 16 per cent lower than the 1927 rate.

Undulant fever.—Reports of undulant fever (Malta fever) from many sources showed 666 cases in 1928. The disease is important from a public health standpoint. A few years ago it was thought to be rare in the United States.

Whooping cough.—The recorded cases of whooping cough and the deaths from this disease were fewer in 1928 than they were in 1926 or 1927, but the fact that 43 States reported more than 5,600 deaths from whooping cough during 1928 shows that the disease is a serious one.

DIRECTORIES OF HEALTH OFFICERS

Since 1915 annual directories of State health departments have been compiled and published by the division of sanitary reports and statistics. The directory for the year 1928 was issued in November. It contains a list of the principal officers of each State department of health, including the chiefs of divisions, a statement of the appropriations for the health department, and a list of the publications issued by each department.

A directory of city health officers of cities having more than 10,000 population was issued during the year. The directory for the year 1929 will contain information as to the chiefs of divisions for the health departments of a few of the larger cities. These directories have been issued annually since 1916.

A directory of whole-time county health officers was also issued.

LEGISLATION AND COURT DECISIONS RELATING TO PUBLIC HEALTH

State and Federal laws, regulations, and court decisions.—Since 1911 the Public Health Service has issued annual compilations of statutes and State board of health regulations pertaining to public health. During the fiscal year there was sent to the printer the copy for the compilation covering the calendar year 1927 (Supplement 75). Included in this publication are the statutes on health matters enacted by Congress and the various State legislatures during 1927 and also the State and Federal public health regulations adopted during that year.

Material for the 1928 compilation was also collected during the fiscal year and the preparation of the publication begun.

Work on the collection and analysis of the laws and regulations in force in the United States on the subject of the reporting of communicable diseases was carried on. A review of the judicial decisions on this subject was published in the weekly Public Health Reports.

The searching of current digests for decisions rendered by State and Federal courts of last resort on matters relating to public health and the publication in the Public Health Reports of abstracts of such judicial decisions were continued. Work looking to the publication of another digest of court decisions on health subjects was also carried on.

Municipal ordinances and regulations.—For use in a publication which will contain selected municipal health ordinances and regulations, there was secured during the fiscal year, from those cities in the United States having over 10,000 population in 1920, copies of ordinances and regulations which had been adopted during the calendar year 1928. Periodic compilations of sanitary ordinances and regulations have been issued by the service since 1910.

Comptroller General's decisions.—The current decisions of the Comptroller General of the United States which related directly to the Public Health Service were secured, abstracted, and indexed for use in publications for the information of the service personnel.

Miscellaneous inquiries.—During the year there were received, and complied with as fully as possible, numerous requests for information in regard to statutes, ordinances, regulations, and court decisions dealing with various health matters.

PUBLICATIONS ISSUED BY THE DIVISION

The Public Health Reports (vol. 43, pt. 2, and vol. 44, pt. 1) was issued by the division each week during the fiscal year. As in the past, this publication consisted of statistical material presenting the latest reports of communicable diseases in the United States and of the occurrence of quarantinable diseases in foreign countries, together with text articles reporting the results of current research work in the field of public health carried on by the personnel of the Public Health Service, articles by administrative and research workers outside the service, and abstracts of current court decisions relating to public health. The United States Public Health Service is the Federal agency specifically charged with the collection and dissemination of information regarding the prevalence of communicable diseases as

well as of general sanitary information, and the Public Health Reports is the official medium for publishing this material.

The issues of the Public Health Reports printed during the fiscal year contained 3,362 pages, exclusive of tables of contents, as compared with 3,189 pages for the preceding fiscal year and with 3,520 pages in 1927. Although the total number of pages remained within the average for prior years, the cost of the reports has increased, due to increased costs of printing and to a relative increase in the amount of tabular matter in connection with the reporting of quarantinable diseases in foreign countries, the weekly table for which was revised in January, 1928, in order better to serve the needs of the quarantine officers.

Sixty-one of the most important articles appearing in Public Health Reports during the fiscal year 1929 were reprinted in pamphlet form, thus permitting of a more economical and wider distribution of these articles.

Five supplements (Nos. 69 to 73), consisting of articles too voluminous, too technical, or otherwise unsuited for publication in Public Health Reports, were issued during the year.

The Ship's Medicine Chest and First Aid at Sea, a handbook designed for use on ships having no physician on board, was prepared and issued by the division, as were also the National Negro Health Week Program and Poster, outlining a program for concerted and effective attack upon the important sanitary problems and prepared especially for use by community leaders in interesting individuals in this annual health campaign.

New editions of 11 previously issued publications were printed during the fiscal year.

HEALTH INFORMATION BY RADIO

The dissemination of health information by radio and through articles in newspapers and magazines was continued as heretofore. This service was inaugurated in December, 1921.

At the close of the fiscal year, 54 stations were cooperating with the Public Health Service in the dissemination of this material. During the past fiscal year two lectures a month were prepared for release through these stations.

Since March, 1922, the Foreign Language Information Service, of New York City, has translated these talks into other languages than English and has submitted them for publication to magazines and newspapers using its service. In addition to their use by the foreign-language magazines and newspapers, many magazines and newspapers printed in English published these lectures. At the close of the fiscal year 1929, 345 lectures had been issued since the beginning of this work.

SECTION OF PUBLIC HEALTH EDUCATION

During the fiscal year ended June 30, 1929, 61 new service publications were distributed by the section of public-health education, as compared with 87 during the preceding year. The smaller number of new publications was due to increased cost of printing with a decrease in the printing allotment available to the Public Health Service. It was necessary, owing to insufficient funds for printing, to postpone

the printing of a number of publications until the following fiscal year. The total distribution of copies of new publications and of editions of previously published documents aggregated 239,513, as compared with 236,728 during the preceding fiscal year. Out of the 239,513 copies of publications distributed, 212,300 were sent in response to individual requests for information. The remaining copies were distributed to the various mailing lists maintained by the bureau. This distribution does not include the publications printed and distributed by the division of venereal diseases, nor the service regulations and official service roster distributed by the chief clerk's office.

There were 20 requests for the loan of stereopticon slides during the year. Approximately 2,000 slides were loaned to universities, officials of the Public Health Service, and others in response to these requests. The work of the stereopticon library has been greatly handicapped during the past 10 years owing to the shortage of slides and to the lack of funds for making up-to-date slides and replacing those which have been broken from time to time in transit.

As in previous years, many requests have been received for the loan of exhibit material, posters, mats, and especially motion-picture films, but because of the lack of funds compliance with most of these requests has been impossible.

An exhibit was prepared by the Public Health Service for the exposition at Seville, Spain, to be held from March 15, 1929, to March 15, 1930, the funds for the preparation of which were made available by a special congressional appropriation.

PUBLICATIONS DISTRIBUTED BY THE DIVISION

The following is a list of publications distributed by the division during the fiscal year:

REPRINTS FROM THE PUBLIC HEALTH REPORTS

1227. The incidence of various diseases according to age. Hagerstown morbidity studies No. VIII. By Edgar Sydenstricker. May 11, 1928. 33 pages.
1228. The full-time county health program developed in the Mississippi Valley following the flood. By J. G. Townsend. May 18, 1928. 9 pages.
1229. Sex differences in the incidence of certain diseases at different ages. Hagerstown morbidity studies No. IX. By Edgar Sydenstricker. May 25, 1928. 18 pages.
1230. Loosely bound sulphur in pituitary extracts. By M. X. Sullivan and M. I. Smith. June 1, 1928. 9 pages.
1231. A study of the blacktongue-preventive action of 16 foodstuffs, with special reference to the identity of blacktongue of dogs and pellagra of man. By Joseph Goldberger, G. A. Wheeler, R. D. Lillie, and L. M. Rogers. June 8, 1928. 70 pages.
1232. Sewage-polluted surface waters as a source of water supply. By H. W. Streeter. June 15, 1928. 25 pages.
1233. Occupational mortality among males in England and Wales, 1921-1923. A summary of the Report of the Registrar General. By Rollo H. Britten. June 22, 1928. 51 pages.
1234. A unit for scarlet fever streptococcus antitoxin. By R. E. Dyer. June 29, 1928. 5 pages.
1235. A special study of the vision of school children. By Grover A. Kempf, Bernard L. Jarman, and Selwyn D. Collins. July 6, 1928. 27 pages.
1236. International sanitary convention of Paris of June 22, 1926. Ratified by the Senate March 22, 1928. Ratified by the President April 7, 1928. Ratification deposited with the Government of France May 22, 1928. Proclaimed by the President June 21, 1928. July 13, 1928. 70 pages.

1237. Benzol poisoning as a possible hazard in chemical laboratories. By J. J. Bloomfield. July 20, 1928. 4 pages.
1238. Public Health Service publications. A list of publications issued during the period July, 1927-June, 1928. July 20, 1928. 6 pages.
1239. Trend of disabling sickness among employees of a public utility. By Dean K. Brundage. July 27, 1928. 28 pages.
1240. Regulating the production, handling, and distribution of milk. By Harvey Walker. August 10, 1928. 14 pages.
1241. Biological products. Establishments licensed for the propagation and sale of viruses, serums, toxins, and analogous products. August 10, 1928. 5 pages.
1242. Trachoma studies. I. The origin and nature of the Von Prowazek-Halberstaedter inclusion bodies in trachoma. II. The experimental production in laboratory animals of forms resembling the "elementary bodies" of Von Prowazek and the "initial bodies" of Lindner. By Ida A. Bengtson. August 24, 1928. 11 pages.
1243. Marine hospital patients and other beneficiaries of the Public Health Service. By F. C. Smith. August 31, 1928. 10 pages.
1244. Microscopic pathology attending exposure of guinea pigs to vapors of ethyl bromide. By C. P. Waite and W. P. Yant. August 31, 1928. 6 pages.
1245. Health hazards in chromium plating. By J. J. Bloomfield and William Blum. September 7, 1928. 22 pages.
1246. An outbreak of typhoid fever and gastroenteritis attributed to the consumption of raw oysters. By George H. Ramsey, G. F. McGinnes, and Paul R. Neal. September 14, 1928. 11 pages.
1247. The epidemiology of undulant (Malta) fever in Iowa. (Preliminary report.) By A. V. Hardy. September 21, 1928. 11 pages.
1248. The treatment of sewage by stream-flow aeration. By Harry N. Jenks and Max Levine. September 28, 1928. 16 pages.
1249. Sewage-treatment plant at the Grand Canyon National Park. By H. B. Hommon. October 5, 1928. 16 pages.
1250. Fumigation with cyanogen products. Report of experiments conducted with cyanogen products used in the fumigation of vessels for quarantine purposes at the New York quarantine station, Rosebank, Staten Island, N. Y. By C. V. Akin and G. C. Sherrard. October 12, 1928. 24 pages.
1251. Health studies of negro children. II. The physical status of the urban negro child. A study of 5,170 negro school children in Atlanta, Ga. By E. Blanche Sterling. October 19, 1928. 62 pages.
1252. The increased susceptibility of the albino rat infected with the tubercle bacillus to tuberculin. By Maurice I. Smith. October 26, 1928. 12 pages.
1253. The oral administration of derivatives of chaulmoogra oil in leprosy. By N. E. Wayson and L. F. Badger. November 2, 1928. 2 pages.
1254. State and insular health authorities, 1928. Directory with data as to appropriations and publications. November 2, 1928. 22 pages.
1255. Milk consumption in 18 small Alabama communities. By Charles N. Leach and Leslie C. Frank. November 9, 1928. 4 pages.
1256. The thyroid gland and communicable diseases. Immediate and remote effects of communicable diseases upon the thyroid glands of elementary-school children in Cincinnati. By Robert Olesen. November 16, 1928. 12 pages.
1257. City health officers, 1928. Directory of those in cities of 10,000 or more population. November 16, 1928. 12 pages.
1258. Distribution of endemic typhus (Brill's disease) in the United States. By Kenneth F. Maxcy. November 23, 1928. 12 pages.
1259. Cooperative rural health work of the Public Health Service in the fiscal year 1928. By L. L. Lumsden. November 30, 1928. 59 pages.
1260. Changes in the regulations proposed for tetraethyl lead gasoline. November 30, 1928. 2 pages.
1261. A review of the current practice of the lighting of school buildings in the United States. By James E. Ives. December 14, 1928. 8 pages.
1262. Tularemia in sheep in nature. By R. R. Parker and J. S. Dade. January 18, 1929. 5 pages.
1263. Rocky mountain spotted fever. A preliminary report on the Weil-Felix reaction. By A. L. Kerlee and R. R. Spencer. January 25, 1929. 4 pages.

1264. A study of the relationship between type of school ventilation and respiratory illness in certain schools of New Haven, Conn. By Leonard Greenburg. February 8, 1929. 17 pages.
1265. The nature of the effect of a high-frequency electric field upon paramæcium. By H. Kahler, H. W. Chalkley, and Carl Voegtlin. February 15, 1929. 8 pages.
1266. Sickness among industrial employees. Frequency of disability lasting longer than one week from important causes among 165,000 persons in industry in 1927 and a summary of the morbidity experience from 1920 to 1927. By Dean K. Brundage. February 22, 1929. 17 pages.
1267. A rat and a rat-flea survey of ships at the port of New York. A study of ships' rats and fleas as they are concerned in the transfer of bubonic plague with particular reference to maritime quarantine. By C. L. Williams. March 1, 1929. 34 pages.

SUPPLEMENTS TO THE PUBLIC HEALTH REPORTS

69. Studies on oxidation-reduction. XIII. Preparation of indophenols which may be used as oxidation-reduction indicators. By H. D. Gibbs, W. L. Hall, and W. M. Clark. 1928. 35 pages.
70. The notifiable diseases. Prevalence during 1927 in cities of over 100,000. 1928. 33 pages.
71. Studies on oxidation-reduction. XIV. Equilibrium potentials of 2, 6-dibromobenzene indophenol-2'-sodium sulphonate, 2, 6-dibromobenzene indophenol-3'-sodium sulphonate, 2, 6-dichlorobenzene indo-2'-chlorophenol, and 2, 6-dimethylbenzene indophenol. By Wallace L. Hall, Paul W. Preisler, and Barnett Cohen. 1928. 26 pages.
72. The notifiable diseases. Prevalence during 1927 in cities of 10,000 to 100,000 population. 1929. 94 pages.
73. The notifiable diseases. Prevalence in States, 1927. 1929. 68 pages.

PUBLIC HEALTH BULLETINS

179. Studies in physical development and posture. I. The effect of exercise on the physical condition and development of adolescent boys. II. Bodily growth with age. III. Physical fitness as reflected in tests of muscular strength. By Louis Schwartz, Rollo H. Britten, and Lewis R. Thompson. June, 1928. 124 pages.
180. The rat. Arguments for its elimination and methods for its destruction. Prepared by Surg. R. H. Creel, May, 1919, and published as Public Health Bulletin No. 103. Revised by Surg. C. V. Akin, March, 1928. August, 1928. 10 pages.
181. Studies in illumination. II. Relationship of illumination to ocular efficiency and ocular fatigue among the letter separators in the Chicago post office. By Langdon R. White, Rollo H. Britten, James E. Ives, and Lewis R. Thompson. December, 1928. 58 pages.
182. Refractive errors in the eyes of children as determined by retinoscopic examination with a cycloplegic. Results of eye examinations of 1,860 white school children in Washington, D. C. By Grover A. Kempf, Selwyn D. Collins, and Bernard L. Jarman. December, 1928. 56 pages.
183. Transactions of the eighth annual conference of State sanitary engineers. Held at Chicago, Ill., June 4 and 6, 1927. October, 1928. 133 pages.
184. Health departments of States and Provinces of the United States and Canada. Compilation by John A. Ferrell, Wilson G. Smillie, Platt W. Covington, and Pauline A. Mead. April, 1929. 727 pages.
185. Physiological response attending exposure to vapors of methyl bromide, methyl chloride, ethyl bromide and ethyl chloride. Prepared from data contained in the report of the Bureau of Mines to the National Research Council and the Dow Chemical Co. By R. R. Sayers, W. P. Yant, B. G. H. Thomas, and L. B. Berger. March, 1929. 56 pages.
186. Effect of repeated daily exposure of several hours to small amounts of automobile exhaust gas. Prepared from data contained in the report of the Bureau of Mines to the New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission. By R. R. Sayers, W. P. Yant, Edward Levy, and W. B. Fulton. March, 1929. 58 pages.

HYGIENIC LABORATORY BULLETINS

153. A study of endemic pellagra in some cotton-mill villages of South Carolina. By Joseph Goldberger, G. A. Wheeler, Edgar Sydenstricker, Wilford I. King, Wm. S. Bean, jr., R. E. Dyer, J. D. Reichard, P. M. Stewart, M. C. Edmonds, R. E. Tarbett, Dorothy Wiehl, and Jennie C. Goddard. January, 1929. 85 pages.

MISCELLANEOUS PUBLICATIONS

9. The ship's medicine chest and first aid at sea. Compiled and edited by medical officers of the United States Public Health Service. 1929. 207 pages.
11. Official list of commissioned and other officers of the United States Public Health Service. Also list of United States marine hospitals, quarantine, immigration and relief stations, and quarantine vessels. July 1, 1928. 1928. 90 pages.

ANNUAL REPORT

Annual report of the Surgeon General of the United States Public Health Service for the fiscal year 1928. 346 pages. Cloth.

UNNUMBERED PUBLICATIONS

- National negro health week program. This pamphlet is published annually, usually about the middle of March, for community leaders in an effort to suggest ways and means by which interested individuals and organizations may be organized for a concerted and effective attack upon the community's disease problems. 1929. 17 pages. (Out of print.)
- National negro health week poster. 1929. In colors. (Out of print.)
- Report of the joint committee on swimming pools and bathing places. Eighth annual conference of State sanitary engineers, 1928. (Excerpt from Public Health Bulletin No. 183). 1929. 27 pages.

DIVISION OF MARINE HOSPITALS AND RELIEF

In charge of Asst. Surg. Gen. F. C. SMITH

To furnish hospital and out-patient care to seamen from American merchant vessels and other legal beneficiaries has continued to be the chief function of this division. Medical relief stations were maintained in 155 ports of the United States and the insular and Territorial possessions primarily for the benefit of the American merchant marine and its personnel. The various classes of beneficiaries and the amount and character of medical services rendered are shown in the table below. The reviving public interest in American shipping and the effects of the merchant marine acts of 1920 and 1928 have manifested themselves in greater demands for the medical services which for 131 years the Government has furnished its merchant seamen. During the year 379,731 persons applied for treatment or other medical services at the marine hospitals and other relief stations.

Classes of beneficiaries and amount and character of services rendered

Class of beneficiary	Hospital days		Out-patient treatments		Physical examinations (not related to treatment)		Remarks
	Number	Per cent of total	Number	Per cent of total	Number	Per cent of total	
American merchant seamen.	934, 673	63. 89	351, 854	47. 48	26, 233	22. 96	Communicable diseases reported to local health officers.
Veterans.....	155, 553	10. 64	2, 799	. 37	103	-----	Admitted all marine hospitals on request from United States Veterans' Bureau.
Lepers.....	109, 743	7. 5	-----	-----	-----	-----	Admitted National Leper Home upon request of State health officers.
United States Coast Guard personnel.	88, 870	6. 08	169, 697	22. 89	17, 748	15. 53	All medical services ashore and afloat, including emergency care abroad.
Injured Federal employees.	56, 572	3. 88	167, 279	22. 57	19, 143	16. 75	Admitted all marine hospitals and other relief stations on request from United States Employees' Compensation Commission.
Immigrants.....	46, 901	3. 21	1, 413	. 19	-----	-----	Cooperation with Bureau of Immigration (Department of Labor), medical inspection of aliens described elsewhere.
Seamen, United States Engineer Corps and Army Transport Service.	32, 399	2. 2	7, 847	1. 05	122	-----	Civilian employees on United States Army vessels.
Seamen from foreign vessels.	13, 793	. 94	554	-----	115	-----	Pay patients admitted at request of foreign consuls and masters of vessels.
Seamen and keepers, United States Lighthouse Service.	10, 422	. 71	4, 560	. 62	285	-----	Medical supplies also furnished to lighthouse vessels.
Alaska cannery workers leaving United States.	-----	-----	-----	-----	11, 723	10 26	Vaccinations and other preventive measures in cooperation with Alaska Territorial government.
Pilots and other licensees..	-----	-----	-----	-----	5, 556	4 86	Color vision tests; first-aid proficiency. Cooperation with Steamboat Inspection Service (Department of Commerce).
United States Civil Service applicants and employees.	-----	-----	-----	-----	19, 842	17. 36	Cooperation with Civil Service Commission.

Classes of beneficiaries and amount and character of services rendered—Continued

Class of beneficiary	Hospital days		Out-patient treatments		Physical examinations (not related to treatment)		Remarks
	Number	Per cent of total	Number	Per cent of total	Number	Per cent of total	
United States Shipping Board.	-----	-----	-----	-----	5,772	5.05	Examinations to determine fitness of crews for sea duty at request of United States Shipping Board.
All others entitled to treatment.	13,789	.95	33,754	4.56	7,276	5.54	This group includes patients of Bureau of Fisheries, Army, Navy, and Marine Corps, Mississippi River Commission, Bureau of Pensions, Coast and Geodetic Survey, field employees of the Public Health Service, etc.
Total.....	1,462,715	100	741,103	100	114,272	100	

The character of the American seaman has changed considerably in recent years, reflecting, of course, the general economic improvement in the working man's status. He is more intelligent and temperate, cleaner, and better paid. He seeks medical advice more promptly and for less serious disabilities than in the old days when sailors were prone to neglect themselves, although the character of his diseases has not greatly changed except for the almost total disappearance of typhoid fever, smallpox, and typhus fever. Venereal disease is still a major problem. Out of 37,920 patients discharged from hospital during the year, 6,190, or 16.3 per cent, were treated for venereal disease. (See Table No. 4, p. 255.) The largest number of patient days, 230,574, amounting to 18.1 per cent of the total hospital days, was for patients with venereal disease. (See Table No. 7, p. 260.) As an immediate cause of death venereal disease is not so important, only 38 deaths out of 1,058 for the year being chargeable to this cause. The principal causes of death in the order of importance were 215 from tuberculosis, 188 from diseases of the heart and circulatory system, 120 from pneumonia (which includes bronchial pneumonia), 82 from cancer and other malignant tumors. (See Table No. 5, p. 257.) Deaths from external cause in hospital numbered 56; this, of course, does not include any deaths from violence that occurred outside hospital. The prevalence of influenza caused an increase in expenditures for contract hospital care at Seattle, Portland (Oreg.), San Pedro, Los Angeles, Manitowoc (Wis.), and Charleston, while at Fort Stanton it was necessary to temporarily convert the library and amusement hall into an influenza ward. More than 54,000 surgical operations were performed and 32,247 intravenous injections of arsphenamine and neoarsphenamine were administered.

Of 37,920 patients discharged from hospital, 27,211, or 71.7 per cent, were born in the United States or the insular possessions. (See Table No. 9, p. 262.) Among the seamen patients from American merchant vessels, 1,130 were born in Norway, 745 in Sweden, 718 in Canada, 665 in Germany, 509 in Ireland, 482 in England, and 403 in Spain. A considerable number of foreign-born seamen serving American vessels

GROUP HOSPITALS	HOSPITAL LOCATION	COST PER PATIENT DAY					Station Production						
		RELIEF DAYS	TOTAL	SALARIES	FOOD	OTHER	1	2	3	4	5	6	7
GENERAL	Baltimore, Md.	73,305	\$3.25	\$1.99	\$0.57	\$3.69							
	Boston, Mass.	56,084	1.80	1.98	.59	1.21							
	Buffalo, N. Y.	28,804	4.61	2.62	.55	1.34							
	Chicago, Ill.	52,437	4.30	2.05	.62	1.61							
	Cleveland, Ohio	30,849	4.54	2.70	.58	1.26							
	Detroit, Mich.	28,382	4.20	2.55	.58	1.06							
	Ellis Island, N. Y.	133,816	4.56	2.23	.67	1.60							
	Kansasville, Ind.	19,951	1.49	1.76	.54	1.13							
	Key West, Fla.	25,537	3.59	1.47	.65	1.47							
	Louisville, Ky.	23,520	3.79	2.13	.57	1.04							
	Memphis, Tenn.	19,712	3.71	2.15	.56	1.01							
	Mobile, Ala.	31,573	3.74	2.15	.56	1.02							
	New Orleans, La.	113,045	3.85	2.30	.54	1.01							
	Norfolk, Va.	75,844	3.70	2.02	.61	1.07							
	Pittsburgh, Pa.	25,853	4.35	2.24	.60	1.52							
	Portland, Me.	22,862	4.55	2.46	.69	1.41							
	Port Townsend, Wash.	31,931	3.27	1.79	.61	.87							
	St. Louis, Mo.	22,636	4.38	2.50	.54	1.44							
	San Francisco, Calif.	105,105	4.12	2.25	.70	1.17							
	Savannah, Ga.	54,270	3.59	1.93	.59	1.07							
	Siaticton, N. Y.	100,409	4.41	2.61	.55	1.25							
	Vineyard Haven, Mass.	5,322	4.22	1.91	.70	1.61							
	New York, N. Y. (a)												
	Per diem cost for General hospitals		4.03	2.23	.60	1.20							
TUBERCULOSIS SANATORIUM	Total Relief Days	1,100,346	Cost	\$3,182,417.24									
	Fort Stanton, N. M.	86,944	4.54	1.90	.77	2.27							
LEPROSARIUM	Carville, La.	109,685	3.70	2.06	.57	1.07							
	Per diem cost for all hospitals		4.03	2.17	.61	1.25							
ALL	Relief days for all hospitals	1,296,975	Cost	\$4,661,111.09									
	(a) In-Patient department of station closed												

Average per diem cost of in-patient relief, United States marine hospitals, fiscal year 1929

are naturalized citizens and our figures, which relate only to sick and injured, tend to substantiate those published by the sea service bureau of the Shipping Board, which show that 87.2 per cent of all seamen on American merchant vessels are American citizens.

EXPENSES

The normal appropriations, aggregating \$5,165,000, were augmented by the act of May 28, 1928 (Welch bill), which contained an additional appropriation of \$322,660 to increase the pay of field personnel. To these amounts was added \$595,305 received from the United States Veterans' Bureau for medical services rendered, making a total of \$6,082,965 for use. Only repayments received from the Veterans' Bureau are re-expendable. Payments for the care of other patients, namely, those from the military and naval services, seamen from foreign vessels and detained immigrants, together with reimbursements for rations and receipts from the public sale of hides and other surplus or unserviceable articles, aggregating \$165,917.36, were turned into the General Treasury. A number of commissioned officers and pharmacists paid out of the appropriation "Pay of commissioned officers and pharmacists" were also assigned to duty at marine hospitals and other relief stations. The principal items of expense were as follows:

Examination of intending aliens abroad (salaries, travel, etc.)-----	\$116, 669
(NOTE.—For description of this work see page 163.)	
Medical and dental personnel assigned to exclusive duty with the Coast Guard and supplies to Coast Guard vessels and shore stations:	
Salaries of officers-----	\$93, 664
Supplies furnished-----	7, 796
	101, 460
(NOTE.—This does not include any portion of the cost of hospital and out-patient relief furnished Coast Guard personnel at marine hospitals and other relief stations.)	
Treatment and other medical services in American ports and possessions-----	5, 835, 669
Reserve for unknown encumbrances-----	29, 167
Total-----	6, 082, 965

In view of the prevailing public interest in the cost of medical care, an analysis has been made of the item "Treatment and other medical services in American ports and possessions" amounting to \$5,835,669. Of this amount, \$699,935 was expended for hospital and out-patient care at relief stations of the second, third, and fourth classes, which are served by contract hospitals and largely by part-time salaried physicians, and \$311,494 for out-patient care at first-class stations. The balance, \$4,824,240, was the cost of operating the in-patient departments of 24 marine hospitals. The average cost of hospital care, which was \$4.03 per patient per day, is larger than that of the preceding year, due partly to the increases in salary authorized by the Welch bill, which added \$0.226 to the per diem costs.

According to the classification used by the General Accounting Office, the several items of expense were as follows:

01—Personal services.....	\$3, 283, 362
0200—Stationery (janitor and laundry supplies; X-ray films).....	52, 978
0210—Medical and hospital supplies.....	177, 629
0220—Scientific and educational supplies.....	2, 268
0230—Fuel.....	150, 899
0250—Forage.....	49, 159
0260—Provisions.....	1, 126, 420
0280—Sundry supplies.....	62, 709
03—Subsistence and support of persons (contracts with private hospitals).....	548, 451
04—Care animals and vehicles.....	51
0500—Telegraph service.....	889
0510—Telephone service.....	23, 589
06—Travel expense.....	70, 831
07—Transportation of things.....	78, 465
10—Heat, light, power, water and electricity (service).....	176, 055
1100—Rent of buildings and offices.....	26, 139
1110—Other rents.....	5, 533
1280—Repairs and parts motor vehicles.....	7, 929
1290—Repairs and alterations other equipment.....	15, 519
1373—Laundry and towel service (contracts with private laundries).....	35, 959
1375—Ashes and garbage removal (contracts with private persons).....	2, 085
1380—Special and miscellaneous current expenses (service).....	4, 459
2250—Burial expenses.....	22, 689
3000—Motor vehicles.....	7, 287
3010—Furniture, furnishings, and fixtures.....	65, 577
3020—Scientific and educational equipment.....	35, 754
3040—Livestock.....	3, 115
3050—Other equipment.....	17, 998
Reserved for unknown encumbrances.....	29, 167
	6, 082, 965

01—The item of personal services covers salaries and wages of 321 physicians and dentists, 412 nurses, aides and dietitians, and 1,765 other employees. Of this amount \$2,880,205 was expended for salaries at marine hospitals.

0200—For soap, lye, starch, brooms, toilet paper and other janitor and laundry supplies, \$28,509; for X-ray films, \$18,970; for postage stamps, \$325; etc.

0210—Gauze and cotton, \$24,714; clothing for lepers at Carville, \$6,945; anesthetics and adhesive plaster, \$4,515; catgut and other sutures, \$1,910; artificial arms, legs, braces, and other prosthetic appliances, \$2,595; spit-cup fillers, \$1,551; chaulmoogra oil and other special remedies for leprosy, \$815; etc.

0220—The principal item was \$1,803 for subscriptions to medical journals, and laboratory supplies.

0230—Coal cost \$72,820; wood \$13,628; fuel oil and gas \$33,091.

0280—Ice cost \$17,520; electric light bulbs \$2,529; gasoline, oil and grease \$11,347; packing boxes and packing material \$1,951.

3000—Six passenger carrying automobiles were purchased for \$3,111.60 and two new ambulances for \$4,573.

3010—Pajamas, bathrobes, sheets, counterpanes, pillow slips, \$17,445; beds and mattresses, \$5,560; china and glassware \$6,943, and \$8,199 for other hospital and furniture furnishings.

3020—For X-ray machines, \$4,806; operating tables, \$1,339; electro-cardiograph, \$1,250; clinical thermometers \$3,292; medical books, \$1,567; lockers, \$1,278; filing cases, \$1,266; and typewriting machines, \$1,895.

3040—The principal item was cattle for the Fort Stanton herd.

3050—Dishwashing machines, \$1,365; food conveyors, \$552; ranges, \$2,727; lawn mowers, \$1,142; snow remover \$1,000; and refrigerators, \$1,841; etc.

The war surplus stock is now nearly exhausted and henceforth larger expenditures will be necessary for many classes of supplies.

ECONOMIES

Economy has become a fixed habit. In 11 of the smaller marine hospitals the chief nurse acted as dietitian. Waste grease is used in making soap; in one hospital alone (New Orleans) 14,050 pounds of soft soap were made and used. Garbage is sold where salable. Norfolk reclaimed 10,900 yards of gauze valued at \$350. The

dairy herds at Fort Stanton, N. Mex., and Carville, La., effected large savings. The Hygienic Laboratory and State and other public facilities were freely utilized for laboratory tests for which facilities were lacking in the hospitals. At the supply station, Perry Point, Md., several hundred dollars were saved by the use of five carloads of second-hand packing boxes obtained from Government establishments in Washington, and by the manufacture of certain stock medicines for issue. Small X-ray films, 5 inches by 7 inches, have replaced the use of films 8 inches by 10 inches and 10 inches by 12 inches where practicable, and hospital beds and other furniture have been painted and repaired by station labor to prolong their use. The practice of testing clinical thermometers for defects has been continued, and out of 11,977 purchased 867 were rejected as unsuitable for use.

SAFETY X-RAY FILMS

The use of safety X-ray films was instituted in all the marine hospitals on December 20, 1924, on which date the Surgeon General ordered the use of the explosive nitrocellulose type discontinued and the stocks on hand disposed of. The safety films cost more than those of the explosive type and have added approximately \$3,000 per annum to the operating expenses of the marine hospitals. They have, however, been found satisfactory for general use.

WELFARE WORK

Chaplains are not paid salaries by the Public Health Service, but are supplied by various churches and private agencies to the marine hospitals, where they minister to the spiritual needs of patients, conduct burial services and perform other related duties. There are two full-time resident chaplains at both Fort Stanton and Carville. The social-service work is conducted by the chaplains at Stapleton and Norfolk, but at Ellis Island and Hudson Street professional workers are employed, whose most important function is to facilitate the discharge of chronic patients. The Red Cross, American Legion posts and their auxiliaries, Knights of Columbus, Young Mens' Christian Association, and independent workers supply radio sets, books, magazines, games, and music at several marine hospitals. To the Seamen's Church Institute is due an expression of appreciation for important and extensive welfare activities in many hospitals, including the maintenance of several chaplains and at San Francisco and Fort Stanton the operation of recreation buildings. At one marine hospital the Seamen's Church Institute provides occupational therapy, vaudeville entertainments, and a library. It furnished articles of clothing to 460 patients and provided many other items of comfort and luxury that the Government is not authorized to supply. The American Mission to Lepers should also be mentioned for unflinching service in its gift chapel at Carville, and the American Merchant Marine Library Association, which sends its circulating libraries to the marine hospitals as it does to ships.

INSANE AND CHRONIC PATIENTS

Marine hospitals are not equipped to treat insane patients. Inasmuch as a service beneficiary loses none of his rights to care and treatment in an institution operated by the State of which he is a resident, inquiries are routinely made of relatives as to their desire to place such patients in State hospitals before a transfer to the

Government hospital for the insane in Washington is proposed. Forty-nine insane patients were thus discharged from marine hospitals, but the cost of maintenance of the other insane patients retained in special contract hospitals as service beneficiaries was \$90,249.

Tact and a humane attitude are required to expedite the discharge of aged seamen recovered sufficiently for domiciliary care. Thirty-four such patients were placed in Sailors' Snug Harbor, New York City, or admitted to national military homes and similar institutions. Eight seamen from the San Francisco marine hospital were transferred to Sailors' Snug Harbor and one was transferred to his home in the Philippines through the courtesy of steamship companies. The marine hospitals at Ellis Island and Stapleton discharged 6 and 32 patients, respectively, to the Burke Foundation Hospital for convalescent care without service obligation.

INSTRUCTION IN FIRST AID

Instruction in first-aid and ship sanitation was given to ship's officers and candidates for license at 44 relief stations situated at places designated at the request of the Steamboat Inspection Service. The following table shows the extent of first-aid instruction and the results of examinations held during the fiscal year:

Station	Number in-structed	Number exam-ined	Number passed			Number rejected			Time consumed		
			Instructed	Uninstruct-ed	Total	Instructed	Uninstruct-ed	Total	Instruction (hours)	Examination (hours)	Total (hours)
Albany, N. Y.	0	0	0	0	0	0	0	0	0	0	0
Astoria, Oreg.	2	1	1	0	1	0	0	0	12	2	14
Baltimore, Md.	58	129	37	59	96	13	20	33	143	386	529
Bangor, Me.	0	13	0	12	12	0	1	1	0	12	12
Boston (Chelsea), Mass.	0	163	0	152	152	0	11	11	0	84	84
Buffalo, N. Y.	0	21	0	18	18	0	3	3	0	21	21
Charleston, S. C.	0	7	0	6	6	0	1	1	0	7	7
Chicago, Ill.	7	5	3	2	5	0	0	0	12	5	17
Cincinnati, Ohio.	0	1	0	1	1	0	0	0	0	1	1
Cleveland, Ohio.	102	60	51	8	59	0	1	1	20	32	52
Detroit, Mich.	42	42	42	0	42	0	0	0	84	84	168
Duluth, Minn.	0	17	0	16	16	0	1	1	0	9	9
Evansville, Ind.	1	3	1	2	3	0	0	0	3	3	6
Galveston, Tex.	33	50	32	14	46	0	4	4	169	54	223
Grand Haven, Mich.	0	4	0	4	4	0	0	0	0	6	6
Honolulu, Hawaii	0	0	0	0	0	0	0	0	0	0	0
Jacksonville, Fla.	0	34	0	34	34	0	0	0	0	34	34
Juneau, Alaska.	13	13	12	0	12	1	0	1	37	36	73
Louisville, Ky.	0	6	0	5	5	0	1	1	0	6	6
Marquette, Mich.	0	2	0	2	2	0	0	0	0	4	4
Memphis, Tenn.	11	11	11	0	11	0	0	0	132	22	154
Milwaukee, Wis.	0	70	0	70	70	0	0	0	0	70	70
Mobile, Ala.	0	23	0	23	23	0	0	0	0	24	24
Nashville, Tenn.	0	0	0	0	0	0	0	0	0	0	0
New Haven, Conn.	0	11	0	11	11	0	0	0	0	11	11
New London, Conn.	16	41	16	25	41	0	0	0	69	41	110
New Orleans, La.	140	174	105	62	167	5	2	7	78	56	134
New York, N. Y.	499	703	471	167	638	28	37	65	249	494	743
Norfolk, Va.	0	89	0	54	54	0	35	35	0	139	139
Oswego, N. Y.	0	5	0	5	5	0	0	0	0	5	5
Philadelphia, Pa.	34	110	25	75	100	5	5	10	35	104	139
Pittsburgh, Pa.	6	30	6	24	30	0	0	0	8	31	39
Port Huron, Mich.	25	21	21	0	21	0	0	0	51	21	72
Portland, Me.	14	14	13	0	13	1	0	1	23	60	83
Portland, Oreg.	38	39	38	1	39	0	0	0	117	48	165
Providence, R. I.	2	8	1	6	7	0	1	1	3	7	10
St. Louis, Mo.	9	9	9	0	9	0	0	0	5	4	9
San Francisco, Calif.	336	307	251	32	283	16	8	24	181	86	267
San Juan, P. R.	0	2	0	2	2	0	0	0	0	2	2
San Pedro, Calif.	0	52	0	44	44	0	8	8	0	28	28
Savannah, Ga.	1	10	1	9	10	0	0	0	4	28	32
Seattle, Wash.	0	90	0	85	85	0	5	5	0	54	54
Tampa, Fla.	0	16	0	16	16	0	0	0	0	16	16
Toledo, Ohio.	0	0	0	0	0	0	0	0	0	0	0
Total.	1,389	2,406	1,147	1,046	2,193	69	144	213	1,435	2,137	3,572

DENTAL TREATMENT

The demand for dental treatment is increasing, and, as in the previous year, it has been possible to supply only about one-half of the actual needs of beneficiaries. Routine dental examination of all patients applying for medical and surgical treatment shows that seamen's teeth are as a general rule in a deplorable condition. The successful treatment of systemic disease often depends upon the removal of oral infection. The shortened period of hospital care, especially in rheumatism and other conditions of obscure etiology, is due in no small degree to the services of the hospital dental officer. A total of 41,799 patients were treated 193,824 times; 125,693 of these dental treatments were for hospital patients and 67,231 for out-patients. This is an increase of 62,073 treatments over last year.

Additional dental officers are badly needed in the marine hospitals and other relief stations and also for detached duty with the Coast Guard. While 19 medical officers are detailed for full-time duty with the Coast Guard on large cutters and at important shore stations, only one dental officer was so detailed, but during the summer months another was placed at Unalaska to serve several Coast Guard cutters cruising in the vicinity, and a third was assigned to the Coast Guard for a short time.

The total cost of all dental service, including the salaries of officers, assistants, supplies and all overhead cost, amounted to \$169,745.82. Had the total amount of dental treatment been purchased by employing contract dentists instead of service dental officers, the total cost would have been \$396,034.85 (according to authorized fee table by which contract dentists are paid).

The major items of treatment rendered by service dental officers are as follows:

Number of patients treated	41, 799	Gold inlays	744
Number of complete dental examinations	27, 771	Porcelain crowns	35
X-ray exposures	17, 927	Silicate cement fillings	5, 767
Prophylactic treatments		Dentures (full and partial)	2, 069
(hours)	6, 429 $\frac{1}{4}$	Bridges	335
Vincent's stomatitis (hours)	2, 426	Fracture cases and splints	129
Pyorrhea treatments (hours)	1, 789	Fracture treatments (hours)	370
Extractions	32, 102	Consultations (visits to wards)	217
Alloy fillings	18, 205	Microscopic examinations	467

In addition to the above, 3,668 patients were given emergency treatment at small relief stations by local civilian dentists whose aggregate fees amounted to \$24,421.04, an increase over last year of \$4,312.54.

Senior Dental Surg. (R.) C. T. Messner is in charge of all dental operations in the field and the bureau.

COAST GUARD

There has been an increase of 338 in the number of officers and men on active duty and an increase of 33 in retired personnel, making a total of 12,833 persons who are Coast Guard beneficiaries of the Public Health Service. This is the first complete year that the act of May 18, 1928, providing for treatment of retired Coast Guard personnel, has been in effect, and the amount of medical services

rendered to retired personnel in accordance therewith has considerably exceeded the estimates.

The character and comparative amounts of medical services furnished in recent years are shown in the following tables:

Numerical strength of Coast Guard and medical services given

Year	Number of Coast Guard personnel	Hospital days	Out-patient treatments	Physical examinations
1923.....	4,684	41,681	32,530	4,207
1924.....	4,896	36,504	45,857	7,008
1925.....	7,077	60,336	90,494	13,394
1926.....	9,839	71,799	125,226	19,061
1927.....	10,984	76,564	155,977	18,787
1928.....	12,462	85,691	137,971	17,220
1929.....	12,833	88,870	169,697	17,748

Average amount of medical service per person

Year	Hospital days	Out-patient treatments	Physical examinations
1923.....	8.9	6.7	0.9
1924.....	7.6	9.4	1.5
1925.....	8.5	12.8	1.9
1926.....	7.3	12.7	1.9
1927.....	6.9	14.2	1.7
1928.....	6.9	11.0	1.4
1929.....	6.9	13.2	1.4

Twenty-two medical and dental officers are assigned exclusively to Coast Guard duty on cruising cutters or at important shore stations. The blue uniform is now worn by this personnel. One hundred local physicians previously serving under contract to furnish medical and surgical relief and to make physical examinations of Coast Guard and lighthouse personnel at small isolated units have been appointed acting assistant surgeons for the same duty. With the growth of the Coast Guard a corresponding increase is required in medical and dental officers, hospital and dispensary facilities, medical supplies, etc. The number of medical and dental officers assigned to Coast Guard duty has not been sufficient to meet the needs of that service at all times.

Medical officers have been assigned as usual to the vessels of the international ice patrol and to those of the Bering Sea patrol and Arctic cruise. A dental officer was stationed at Unalaska during the cruising season of 1929 and another dental officer was assigned to the *Northland* for the Arctic cruise.

The Coast Guard suffered severely during the influenza epidemic of the winter of 1928-29. From a monthly average of about 60 cases before November, 1928, the number rose rapidly to a peak of 710 cases in January, 1929, after which it declined rapidly. The sick rate due to catarrhal fever, bronchitis, and other diseases commonly associated with influenza was also greatly increased. Venereal disease continues to be a major problem and preventive measures have been intensified. The standard of performance of physical exami-

nations has been greatly improved as a result of the policy of calling the attention of medical officers to errors of importance.

Surg. W. W. King is assigned to duty as medical aide to the commandant at Coast Guard headquarters.

EMPLOYEES' COMPENSATION COMMISSION

Civil employees of the United States injured in line of duty continue to be one of the major classes of beneficiaries of the Public Health Service, which is the principal medical agent of the commission. Such patients increased 11.5 per cent over last year and called for 56,572 hospital days, 167,279 out-patient treatments, and 19,143 physical examinations. Out of every five patients treated at marine hospitals and other relief stations one is a beneficiary of this class. The referee medical examinations required by the longshoremen's and harbor workers' compensation act of May 17, 1928, have added materially to the medical work in the large ports.

Surg. E. C. Ernst is assigned as medical director of the United States Employees' Compensation Commission.

PHYSICAL EXAMINATIONS

More than 100,000 physical examinations, unrelated to treatment, are made each year, and approximately 6 per cent of these examinees are found to have physical defects seriously affecting ability to perform the specified duties which, of course, vary greatly. A cause for rejection in a Coast Guard recruit or an able-bodied seaman would not disqualify a mail-carrier or a civil-service desk worker. An analysis of 6,344 causes for rejection of examinees, including those for all classes and both sexes, shows in the order of importance the following principal pathological conditions: Defective vision, 1,311; under weight, 559; venereal diseases, 547; serious dental defects, 474; hernia, 383; color blindness, 317; under height, 212; albuminuria, 172; valvular heart disease, 169; varicose veins, 132; flat foot, 128; general poor physical condition, 116; pediculosis, 94; tuberculosis, 92; overweight, 91. There were 30 rejections for insanity, mental deficiency, and neurosis, 53 for scabies and ringworm, 73 for tonsillitis (a temporary disability, of course), 70 for otitis media, 3 for sleeping sickness, and 1 for leprosy.

CONSTRUCTION AND REPAIR

Work on the new marine hospitals at Detroit and Cleveland is progressing satisfactorily and these hospitals will probably be ready for the reception of patients in January, 1930, and June, 1930, respectively. The marine hospital at Cleveland will have a bed capacity of 250 and that at Detroit 150.

New marine hospitals are provided for at Baltimore and Stapleton by the act of March 4, 1929 (deficiency act):

Baltimore, Md., Marine Hospital: For demolition of present buildings and commencement of construction of a hospital, including auxiliary buildings outside service lines, and approach work, \$75,000, under an estimated total cost of \$1,620,000.

Stapleton, N. Y., Marine Hospital: For acquisition of additional land and commencement of a general hospital, together with such additional buildings, alterations in, additions to, or demolition of, existing buildings, mechanical equipment, and outside service lines and approach work as may be necessary to provide auxiliary facilities, \$275,000, under an estimated total cost of \$2,500,000.

The Supervising Architect is now preparing plans for the above projects and also for new marine hospitals previously authorized at New Orleans, San Francisco, and Galveston. The hospitals at Baltimore, New Orleans, San Francisco, and Galveston will be commenced during the early part of the calendar year 1930 and completed in about two years' time. The work of remodeling the building recently purchased for an out-patient office at Chestnut and Bank Streets, Philadelphia, will be undertaken the latter part of the calendar year 1929 and will probably be completed six months later. The additional land necessary to provide a site for the Stapleton hospital has not yet been acquired.

Under the act approved March 4, 1929 (H. R. 17223), the limit of cost fixed in the act of March 5, 1928 (45 Stat., p. 180), for the New Orleans marine hospital was increased from \$1,800,000 to \$2,000,000. A tentative allocation of \$1,275,000 has been made for the construction of a marine hospital at Seattle and a site has been donated by the city.

The following projects are listed among those which have so far been omitted in the allocation authorized in the public buildings act:

Boston, Mass., quarters for medical officers and pharmacist; Buffalo, N. Y., and Portland, Me., quarters for medical officers, nurses and attendants, and garage; Detroit, Mich., quarters for medical officers, administrative assistants, and attendants; Evansville, Ind., new building for examining-operating and quarters for nurses; Fort Stanton, N. Mex., new infirmary, personnel quarters; Louisville, Ky., Mobile, Ala., and Pittsburgh, Pa., quarters for medical officers nurses, and attendants; Carville, La., new infirmary and service buildings and quarters for medical officers and administrative assistants; and Norfolk, Va., medical officers' quarters.

In addition to the items mentioned above new construction is required to increase the capacity of the new marine hospital at Detroit and the present marine hospitals at Norfolk, Chicago, Key West, Mobile, and Buffalo.

Improvements were completed from special appropriations approved March 5, 1928, and February 15, 1928, as follows:

Boston, Mass., Marine Hospital: For extension and remodeling of nurses' quarters, improvement of cemetery, exterior painting, and resurfacing of driveways, \$10,000.

Ellis Island, N. Y.: Repairs to hospital buildings and improving existing facilities, \$117,000.

Contracts for the following projects at marine hospitals, special appropriations for which were obtained under the act of March 4, 1929, have been let, and work in connection therewith is now in progress:

Fort Stanton, N. Mex., Marine Hospital: Installation of additional engine and generator, \$12,932.

Carville, La., Marine Hospital: New telephone system, \$4,985. New road, nonclimbable fence; relocating sewer and water lines to permit construction of new levee, \$36,199.12.

Norfolk, Va., Marine Hospital: New concrete breakwater, \$13,288.

Remodeling and other improvements at marine hospitals were accomplished from the appropriation, "Remodeling and Enlarging Public Buildings, 1929," as follows:

Pittsburgh, Pa., Marine Hospital: Remodeling hospital to provide additional ward facilities, increasing the bed capacity from 60 to 77, at a cost of \$4,848.

Portland, Me., Marine Hospital: Remodeling and repairs, increasing the bed capacity to 72, at a cost of \$2,806.

The following improvements have been authorized from the appropriation, "Remodeling and Enlarging Public Buildings, 1930":

Boston, Mass., Marine Hospital: Remodeling of isolation building to provide two sets of quarters for administrative assistants.

Fort Stanton, N. Mex., Marine Hospital: Extension to ward No. 10 to provide additional infirmary facilities.

At Chicago the Lincoln Park Commission finished extensive regrading and planting, improving the appearance of the grounds so that the hospital is now located in a miniature park and well protected from city noises. At Fort Stanton 21 miles of roadway were regraded and two new smokestacks were installed on the boiler house. At Key West the hospital building was repaired and remodeled, increasing the capacity to 60 beds and otherwise improving the facilities. At Louisville brass water piping was installed and exterior wood and iron work were painted. At Memphis a new concrete roadway was constructed. At Vineyard Haven metal ceilings were installed and a new asbestos-shingle roof was placed. At Carville most of the buildings were painted inside and out, two warehouses were reconstructed, and large numbers of seedling trees, shrubs, and hedges were planted.

Inspection Engineer David C. Trott, detailed from the office of the Supervising Architect, is in charge of bureau activities relating to construction and repair of hospitals.

SUPPLIES

A total of 4,116 requisitions were received from the field. Articles approved for issue but not in stock at the supply station are purchased by the division of supply, Treasury Department. The practice has been continued of permitting direct purchases from contractors of certain perishable medical supplies that are purchased either on formal yearly contract or on separate or continuing proposals, as follows:

Suture material.
Adhesive plaster.
Antigen for Kahn precipitation test.
Arsphenamine, neoarsphenamine, sulpharsphenamine and sterile tubes of sodium thiosulphate, U. S. P.
Biological supplies.
Erysipelas antitoxin.
Ether for anesthesia.
Insulin.

Scarlet fever toxin and antitoxin.
Tryparsamide.
X-ray films.
Hospital soft rubber goods.
Nitrous oxide, oxygen, and ethylene gases.
Orthopedic and prosthetic appliances.
Porcelain teeth, facings, and similar supplies.

MEDICINAL LIQUORS AND NARCOTICS FOR VESSELS

In cooperation with the Bureau of Prohibition and in accordance with Treasury Decision No. 3483, approved June 2, 1923, vessels making application for authority to purchase or possess medicinal liquors have received certificates, according to the needs in each case, from the medical officers in charge of relief stations. A total of 11,418 such certificates were issued during the 18 months ending June 30, 1929. Of these, 7,584 were issued at marine hospitals and 3,834 at other relief stations to vessels of various nationalities as follows:

American.....	7, 383	Nicaraguan.....	13
Swedish.....	192	Brazilian.....	10
Dutch.....	199	Chilean.....	4
French.....	94	Venzuelan.....	2
Greek.....	41	Dominican.....	1
Mexican.....	15	Norwegian.....	759
Panaman.....	11	German.....	253
Colombian.....	4	Italian.....	153
Finnish.....	3	Spanish.....	50
Portuguese.....	2	Canadian.....	16
British.....	1, 610	Yugoslavic.....	13
Japanese.....	325	Cuban.....	6
Danish.....	173	Peruvian.....	3
Honduran.....	53	Hungarian.....	2
Belgian.....	27	Czechoslavie.....	1

During the fiscal year 128 purchase orders were issued for narcotic drugs coming within the purview of the act of Congress approved December 17, 1914, for medicinal use on vessels.

ABSTRACTS OF REPORTS FROM MARINE HOSPITALS AND SELECTED RELIEF STATIONS

A tabulation of the transactions at marine hospitals is found on page 249. A brief summary is given below of the detailed annual reports from the marine hospitals and selected representative relief stations.

Marine hospital, Baltimore, Md.—Surg. J. W. Trask in charge. While the hospital has a rated capacity of 167 beds, the average number of patients cared for daily in hospital during the year was a trifle over 200, and the greatest number of patients in the hospital at any one time was 233. The steady increase in the number of patients treated and in the work of the hospital over the past four years is shown in the following table:

Comparison of activities 1926 to 1929, inclusive

	1926	1927	1928	1929
Number of days of hospital treatment furnished.....	54, 884	57, 315	64, 641	73, 306
Number of hospital patients treated.....	1, 389	1, 633	1, 859	2, 042
Number of out-patient treatments furnished.....	19, 793	23, 521	28, 163	28, 751
Number of out-patients treated.....	4, 924	5, 767	6, 549	7, 108

Of the 1,850 patients entering the hospital, 690 were admitted for medical conditions, 601 for surgical conditions, and 559, or approximately 30 per cent, for genito-urinary conditions. There were 56 tuberculous patients admitted, of whom 7 were transferred to Fort Stanton, N. Mex., and 16 insane, of whom 12 were surrendered to State jurisdiction for hospital care and 4 were transferred to St. Elizabeths Hospital. Of the 56 deaths occurring in the hospital, 12 were due to pulmonary tuberculosis, 9 to pneumonia, and 12 to heart disease. There were 814 surgical operations, 5,688 eye, ear, nose, and throat treatments, 18,220 physiotherapy treatments, 32,553 clinical laboratory examinations, and 4,978 X-ray exposures. The dental officer furnished 5,303 treatments, an average of 20 for each working day. The dental department was of great help in cases of oral surgery, of which there were many, the most common being that of

fracture of the lower jaw. A special study was made of the frequency of Vincent's infection, which was found present in 60 per cent of the mouths of dental patients.

A new marine hospital of 325 beds has been authorized by Congress at a limit of cost of \$1,620,000. It will be constructed upon the present site, replacing the old inflammable wards now in use.

The total expenditure amounted to \$238,086.21.

Marine hospital, Boston, Mass.—Surg. A. D. Foster in charge. The average daily number of patients in hospital was 150 and the maximum, 172. Admissions increased 4 per cent over last year. Merchant seamen and Coast Guard men constituted 81 per cent of the hospital patients, which included also 124 immigrants and alien seamen for whose care the Government is reimbursed, and 110 injured Government employees, patients of the Employees' Compensation Commission. There were issued 1,397 permits for small amounts of medicinal liquor to be used on ships.

New X-ray apparatus was installed. An addition to the nurses' home makes it possible for the first time for each nurse to have a separate room. The dental facilities were enlarged and the appearance of buildings and grounds was considerably improved. The hospital and the service are indebted to the chaplain of the first naval district for his offices in visiting wards, holding divine services, and officiating at funerals.

The total expenditure amounted to \$212,896.95.

Marine hospital, Buffalo, N. Y.—Surg. F. C. Turner in charge. To relieve congested wards it was necessary to reduce the rated capacity to 85 beds, although the facilities are inadequate to meet the demands for treatment. An additional hospital wing is needed, especially for patients of the Veterans' Bureau, as this is the only Government hospital in the city. Owing to reduced capacity and an improvement in facilities, the per diem cost increased to \$4.61, which is considerably higher than the average cost in other marine hospitals. Attending specialists in X-ray, surgery, ophthalmology, otology, rhinology and laryngology, orthopedics, medicine, genito-urinary diseases, dermatology, and neuropsychiatry are employed. Cancer diagnoses have been confirmed by the consulting dermatologist and a State cancer institution located in Buffalo. Thirty-four per cent of hospital patients were beneficiaries of the Veterans' Bureau. There were 4,549 dental operations and treatments and 6,803 physiotherapy treatments given. The clinical laboratory, which has been improved, made 6,665 examinations.

The total expenditure amounted to \$132,893.38.

Marine hospital, Carville, La. (National Leper Home).—Surg. (R.) O. E. Denney in charge. More than 300 leper patients are under treatment here, the majority having voluntarily applied for admission because of the encouraging results of modern treatment. During the year 19 patients recovered and were discharged, leprosy arrested. There were 13 deaths.

The total expenditure amounted to \$406,111.09.

(NOTE.—Because of its general and scientific interest the complete annual report of this hospital will be published in the Public Health Reports.)

Marine hospital, Chicago, Ill.—Senior Surg. M. H. Foster in charge. Although all employees have been moved out of the hospital building into the new quarters and the capacity has been increased to 150, it

was impossible to accommodate all patients at certain seasons without overcrowding. Beds were placed in the diet kitchens, smoking rooms, library, and all other available places. From October 1 to July 1 the hospital ran 22 per cent over its normal capacity. The maximum number in hospital was 210 on February 2, 1929.

The diseases and surgical conditions treated during the year were of the usual type. It was noted, as reported last year, that the admissions for pneumonia and venereal disease were unusually low, and for cancer or beginning malignancy fairly high. The new type of spinal anesthesia was used a number of times throughout the year with success. There were 5,836 surgical operations, 3,934 dental treatments, 2,932 X-ray exposures, 11,115 physiotherapy treatments, and 8,089 clinical laboratory examinations.

The total expenditure amounted to \$268,511.42.

Marine hospital, Cleveland, Ohio.—Surg. W. H. Slaughter in charge. Construction of the new hospital at East One hundred and twenty-fourth Street and Fairmont Boulevard has been delayed approximately one year by a strike. It is located upon high ground overlooking Lake Erie, a mile distant. The new institution of 250 beds will relieve the chronic condition of overcrowding in the old marine hospital and is designed to accommodate 100 or more patients of the Veterans' Bureau.

The old hospital, with a normal capacity of 83, is constantly filled, as is evidenced by a daily average of 84 patients. This building and most of the 30-acre site have been sold for \$1,954,025, out of which the new building is being constructed. During the year, 1,980 patients were admitted, of whom 612 were beneficiaries of the Veterans' Bureau. There were 32 deaths, of which 16 were of American seamen and 16 of veterans. The hospital operates medical, surgical, urological, and dental departments; 2,486 surgical operations were performed and 11,908 physiotherapy treatments given. Routine Wassermann tests are made of all patients admitted.

The expenditures amounted to \$140,286.15.

Marine hospital, Detroit, Mich.—Surg. H. E. Trimble in charge. The hospital was filled to capacity during the year, hospital and outpatient office together furnishing treatment to 1,962 American seamen, 300 patients of the Veterans' Bureau, 21 Coast Guard men, 251 patients of the Employees' Compensation Commission, 21 employees of the Lighthouse Service, and 241 other beneficiaries. Physical examinations requiring a written report were given to 2,155. Because of lack of bed capacity a few patients had to be placed in contract hospital.

The new hospital, construction of which was begun on October 22, 1928, will be ready for occupancy by the end of 1929. The increased bed capacity will help to fill the need of the Veterans' Bureau in this vicinity. The present hospital will be taken over by the Immigration Service to be used as quarters for detained aliens.

The hospital furnishes a full-time officer to the Immigration Service for the medical inspection of arriving aliens, and will detail an additional officer to that work in December, 1929, when the new Ambassador Bridge is opened for traffic to the Canadian side of the Detroit River.

The total expenditure for the year amounted to \$119,117.48.

Marine hospital, Ellis Island, N. Y.—Senior Surg. C. H. Lavinder in charge. With the decline in immigration during the past few years and the adoption of a policy to use ward space thus made available for merchant seamen, the hospital has become essentially a marine hospital, in which approximately one-fourth of the beds are occupied by immigrants and the remainder by old-line beneficiaries. The treatment of immigrant patients and regular beneficiaries in the same institution creates certain difficulties in administration, because immigrants are virtually temporary prisoners and restrictions must necessarily be extended to some extent to the other patients.

The total number of patients admitted was 5,195; the daily average was 386; 66 deaths occurred. The surgical service was active, and there is a large tuberculosis ward and provision for other cases of contagious diseases, including a very large venereal service, to which, as a rule, about 150 beds are devoted. The psychopathic department is important, with a clientele subject to sudden sharp increases at times when warrant cases (insane) are brought in by the Immigration Service, and the hospital may be called on to receive as many as 50 to 60 patients at once, many of whom are criminally insane. At such times facilities are taxed to the utmost.

The condition of hospital buildings is far from satisfactory and nearly half a million dollars would be required for proper rehabilitation. Two of the wards damaged by the Black Tom explosion in 1916 have not been repaired and are unused. During the past year, however, \$100,000 has been expended by the Bureau of Immigration in painting the hospital buildings and repairing the plumbing. This has greatly improved the appearance of the hospital, which will necessarily continue to receive the overflow of patients from the overcrowded marine hospital at Stapleton until new construction at the latter institution relieves the situation. The hospital dispensary compounded 9,500 prescriptions and filled 20,000 other orders for nonalcoholic and nonnarcotic drugs, all for ward use. The hospital storerooms filled 13,500 ward requisitions for other supplies. The physiotherapy department gave 10,115 treatments, the X-ray laboratory made 7,141 exposures and the dental officer gave 7,844 treatments. A social service worker recently added to the staff has been instrumental in facilitating the discharge of a large number of chronic patients.

The total expenditure for the year amounted to \$611,762.96.

Marine hospital, Evansville, Ind.—Surg. K. E. Miller in charge. For nearly a year this small hospital has been continuously filled above capacity. To prevent acute overcrowding and to improve facilities, an additional building is needed, and this has been recommended. More than two-thirds of the clientele are patients of the Veterans' Bureau.

The total expenditure amounted to \$69,543.95.

Marine hospital, Fort Stanton, N. Mex.—Surg. J. W. Tappan in charge. Selected tuberculous patients transferred from the other marine hospitals kept this hospital filled to its capacity of 250. Practically all patients are American merchant seamen. The average duration of treatment of those discharged was 498 days, and of the 29 who died, 1,033 days.

The infirmary was crowded to capacity during the winter, and the influenza epidemic in December and January necessitated the use

of the station library as a ward. A new ward is about to be constructed, which will relieve crowded conditions to some extent and allow space for private rooms which are very necessary.

Treatment is the usual sanatorium method, consisting of rest, mental and physical, plenty of wholesome food, fresh air, and sunshine, graduated exercise, and medical and surgical attention when needed. Twenty-eight patients received artificial pneumothorax treatment; 660 inflations were given. Of the 21 patients under this treatment at the present time, 9 have complete compression and the sputum is negative; 12 have partial compression of different degrees, 5 with negative and 7 with positive sputum. Forty-three unsuccessful attempts were made to give artificial pneumothorax treatment to 10 other patients. Seven operations were performed for excision of the phrenic nerve with definite improvement in the majority of these patients, and several extrapleural thorocoplasty operations were done. Laryngeal tuberculosis has been treated by reflected sunlight with varying degrees of success. Thirty-three patients received this treatment 2,238 times, 21 showing improvement and 12 no improvement. Twenty-four other patients were treated by exposure to direct sunlight for nonpulmonary tuberculosis, and 59 were treated by artificial heliotherapy with varying results.

The dental officer operated 2,288 hours, devoting himself to the most urgent needs of the greatest number of patients that he was able to serve. The occupational therapy section gave 144 patients 12,849 hours of treatment, and the educational section instructed 40 men an aggregate of 4,111 hours. The occupational therapy section as a therapeutic measure is growing in importance each year. Thirty-one patients of the ambulatory section were given employment during the year and earned a total of \$12,854.85. To others needing occupation the crafts supply it. The educational section includes a school where the men take up various subjects, both as mental diversion and to improve their education. Shorthand, typing, Spanish, and geometry are now included in the course of study.

Two moving pictures are furnished patients weekly, and in season baseball games are played for the benefit of the patients. The radio ear phones continue to be a source of pleasure for bed patients in the infirmary and loud-speakers are provided in the recreation rooms. Additional shelves have been placed in the library to facilitate the handling of many new books received through donations and purchase. Two chaplains, one Catholic and one Protestant, maintained by their respective organizations, the Chaplain's Aid Association of New York and the Seamen's Church Institute of New York, are detailed for duty in the hospital. In addition to visiting the infirmary wards, chapel services are conducted regularly.

Beef, pork, eggs, and poultry to the value of \$48,960.22, and milk valued at \$25,386.46 were produced by the farm and are included in the operating cost. Two carloads of canned goods and one car of potatoes were purchased at a considerable saving. The entire range and dairy herds were tested for tuberculosis; no reactors were found and an accredited-herd certificate was granted by the Bureau of Animal Industry March 5, 1929.

The total expenditure amounted to \$394,642.51.

Marine hospital, Key West, Fla.—Surg. M. S. Lombard in charge. The capacity of this hospital, which is a native stone structure 85

years old, was increased to 60; and since it is the only Government hospital in southern Florida, all ward space was fully utilized. The largest number of patients, 89, were under treatment on January 22, 1929. Twenty-seven per cent of the patients were beneficiaries of the Veterans' Bureau. Increased activities occurred in all departments, but especially in the surgical service, which handled 968 operations, of which 212 were classed as major, and applied 4,201 dressings. Through the radio the station communicated medical advice to 32 ships at sea, with which 105 messages were exchanged, and also arranged for the admission of 18 patients by transfers from ships at sea to commercial boats, which conveyed them to port.

The total expenditure amounted to \$91,965.02.

Marine hospital, Louisville, Ky.—Surg. E. H. Mullan in charge. This hospital admits patients of the Veterans' Bureau, who comprised 73 per cent of all the patients, river seamen, injured Government employees who are patients of the Employees' Compensation Commission, and military personnel stationed in the vicinity. The capacity was increased to 71 by converting quarters into small wards and private rooms which have been used for river captains, very ill patients, and isolation cases. Although 83 patients were at one time in the hospital, it was necessary to reduce the number by restricting admissions to prevent overcrowding. Specialists from the city have been freely employed for surgery, urology, neuropsychiatry, internal medicine, eye, ear, nose, and throat work, dentistry, and pathology. The laboratory of the University of Kentucky, at Lexington, has performed much valuable clinical laboratory work as a courtesy. Radium treatment and X-ray work beyond the capacity of the small hospital machine are obtained by contract. A storm in January carried away half the roof, but hospital functions were not interrupted.

The total expenditure amounted to \$89,473.74.

Marine hospital, Memphis, Tenn.—Surg. R. L. Allen in charge. The hospital reservation consists of about four acres of level ground situated upon a bluff overlooking the Mississippi River and directly opposite a city park. The location is an ideal one for the hospital, which, as a whole, presents a very pleasing appearance. The grounds are well kept and the buildings are in good state of repair. There has been a slight increase in the number of hospital patients and an increase of about 70 per cent in the past year, and almost 200 per cent in the past two years in the out-patient work. Approximately one-third of the patients are beneficiaries of the Employees' Compensation Commission.

There was a marked decrease in the number of malarial patients, attributable to the efficient antimalarial work being done in the vicinity.

The total expenditure amounted to \$73,833.37.

Marine hospital, Mobile, Ala.—Surg. W. S. Bean in charge. This hospital, with a normal capacity of 90, is overcrowded. On many occasions beds are placed in hallways and at all seasons of the year on porches. This is objectionable, particularly in winter and, moreover, hallways and porches are needed for convalescent patients. The Alabama State docks have been completed and the harbor has otherwise improved. To keep pace with the growth of local shipping, an addition to the hospital is needed.

A total of 974 patients were admitted, of whom 646 were merchant seamen, the largest number ever admitted to this hospital in a single year since it was built in 1837.

The total expenditure amounted to \$118,216.35.

Marine hospital, New Orleans, La.—Surg. W. C. Rucker in charge. The professional services of the station have been continued without interruption or diminution in efficiency despite the fact that since November 1, 1928, 17 buildings have been moved by station labor to clear the grounds for the erection of a new hospital.

The weekly lectures to ambulatory patients on personal hygiene, initiated in 1927, have been continued without abatement of interest. This program of hygienic instruction of the beneficiaries of the service has been introduced at other stations during the year. Fifteen student medical officers and three dental internes were given a thorough course of training with a view to their becoming officers of the service. Thirteen of these have been commissioned.

The practice of giving weekly lectures on personal hygiene to ambulatory patients was initiated at this station in 1927, motion pictures and stereopticon slides being used to illustrate these talks. Later, in view of the keen interest manifested by patients, the lectures were increased to two weekly. In this way a far-reaching educational propaganda has been launched, because not only are the hearers of the lectures indoctrinated with general health information and the necessity and methods of avoiding the venereal infections, but upon their return to their ships they will undoubtedly disseminate to fellow members of the crew at least part of the information thus gained. Detailed results are found in the report of the division of venereal diseases. The plan was extended to other marine hospitals, and periodic lectures are now being given to the ambulatory patients at all of the large hospitals and several Coast Guard bases.

The following is a summary of the stations' operations for the year:

Hospital patients treated.....	3, 536
Operations, surgical operating room.....	481
Doses of salvarsan.....	3, 138
Spinal punctures (urological service).....	261
Operative procedures (urological service).....	4, 638
Treatments (eye, ear, nose, and throat clinic).....	8, 183
Operations (eye, ear, nose, and throat clinic).....	242
Refractions (eye, ear, nose, and throat clinic).....	174
Treatments (dental department).....	25, 716
Examinations (dental department).....	4, 475
Treatments (physiotherapy department).....	16, 074
Examinations (clinical laboratory).....	32, 818
Exposures (Röntgenology department).....	6, 182
Consultations with consultants.....	6, 350
Men instructed in first aid.....	140
Men given first aid examinations.....	173
Number of medicinal liquor permits issued to ships.....	903
Deaths.....	84
Autopsies (64.2 per cent).....	54

The total expenditure for the year amounted to \$439,108.48.

Marine hospital, New York, N. Y.—Surg. P. M. Stewart in charge. This station operates branch out-patient offices at the barge office and the main post-office building. A ships' liquor permit office is also maintained at the customhouse. Three new ambulances were recently supplied to replace worn-out vehicles. The ambulance calls numbered 857, the maximum number on one day being 11.

Dangerously ill patients are placed temporarily in civil hospitals to avoid long hauls to the marine hospitals.

The clinical transactions for the year included 126,119 treatments, 11,155 antisyphilitic injections, and 16,516 physical examinations. The X-ray department handled 7,663 patients, making 24,079 exposures and giving 334 X-ray treatments. The physiotherapy clinic was enlarged by three adjoining rooms formerly used as attendants' quarters, and an electro-cardiograph machine was installed. A full-time medical officer is in charge of this clinic. The dental work has steadily increased, and an oral hygienist and a dental laboratory technician were added to the force, which operates seven complete dental units and a large and well-equipped dental laboratory, but is unable to cope with the increasing demands for dental treatment. The skin and syphilis and genito-urinary clinics are still operated three evenings a week. An electrically operated cystourography table has been added to the equipment. Unoccupied rooms in the garage have been equipped for housing male employees.

The activities of this station have been greatly increased because of the physical examinations of beneficiaries of the Employees' Compensation Commission under the longshoremen act. In addition to a full-time medical officer, the services of three consultants and the entire clinical facilities of the station are shared in connection with this work. Many X-ray exposures were required for this class of beneficiary.

Marine hospital, Norfolk, Va.—Surg. S. L. Christian in charge. The work at this station during the past fiscal year has been the largest in its history. There have been few times during the last nine months when the census did not show an excess of patients over the rated capacity of the hospital, 217. The greatest number of patients hospitalized was 240, on February 6, 1929. There were 2,331 beneficiaries admitted to hospital, of which 417 were patients of the Veterans' Bureau, 165 patients of the Employees' Compensation Commission, and 199 Coast Guard personnel. There were 2,977 surgical operations, 5,592 dental treatments, 2,331 intravenous administrations of arsphenamine, 22,156 treatments by physiotherapy, and 11,066 laboratory examinations, including 2,971 blood Wassermann tests.

Six private rooms have been completely equipped with all-steel hospital furniture, finished in mahogany, consisting of beds, dressers, bedside stands, and chairs. Upon request of the medical officer in charge, the street car company built a waiting station opposite the hospital, the telephone company laid underground cables and will remove its telephone poles, and the city has undertaken to pave the street in front of the hospital. A concrete breakwater, to improve the appearance of the reservation and preserve valuable Government ground from loss as a result of storms and high seas, has been provided for in a recent appropriation of \$15,000, and the contract for its construction has been made by the Supervising Architect.

The total expenditure amounted to \$284,006.31.

Marine hospital, Pittsburgh, Pa.—Surg. T. B. H. Anderson in charge. The rated bed capacity of this station was increased in December from 60 to 77 by converting the nurses' quarters in the main hospital building into wards. This space makes an excellent unit for acute medical cases as it contains five small wards. Bed facilities have

been used to the fullest extent possible, and there can be no marked increase in the number of hospital patients because of limited capacity. A total of 744 patients were treated in hospital during the year, of which 567 were patients of the Veterans' Bureau. The daily average number of patients in hospital was 74.

The total expenditure amounted to \$117,314.57.

Marine hospital, Portland, Me.—Surg. G. Parcher in charge. The bed capacity was increased to 72 by remodeling and a rearrangement of facilities, and the number of patients increased 9.2 per cent over the preceding year. During January and February when influenza was epidemic, the number of hospital patients frequently exceeded the normal bed capacity. The number of out-patients and out-patient treatments increased 50 per cent. A dental officer has been added to the hospital staff. Fifty-seven per cent of the hospital patients consists of beneficiaries of the Veterans' Bureau. There were 617 surgical operations, 1,145 X-ray exposures, 4,262 physiotherapy treatments, and 3,208 clinical laboratory examinations.

The total expenditure amounted to \$104,085.72.

Marine hospital, Port Townsend, Wash.—Surg. O. H. Cox in charge. Ninety per cent of the patients admitted to this hospital are merchant seamen. The majority of the remainder are patients of the Coast Guard, as the patrol fleet of Puget Sound bases in Port Townsend, and the Alaska cruise vessels recruit, outfit, and spend part of the year in adjacent ports. The Seattle relief station is advised by daily telegram of the number of beds available and the 100 beds are kept constantly filled. The amount of surgery has increased, as has also the number of tuberculous patients. Lack of space has prevented the admission of patients of the Veterans' Bureau.

The expenditures amounted to \$110,559.41.

Marine hospital, St. Louis, Mo.—Surg. F. H. McKeon in charge. This hospital of 70 beds was kept well filled. The number of days' relief furnished was 22,634, divided among various classes of beneficiaries as follows:

Merchant seamen.....	10, 299
Employees' Compensation Commission.....	4, 474
Engineer Corps, U. S. Army.....	5, 616
Mississippi Warrior Service.....	1, 330
U. S. Veterans' Bureau.....	651
U. S. Navy.....	100
U. S. Public Health Service.....	56
U. S. Coast Guard.....	13
U. S. Lighthouse Service.....	95

The services of the consulting staff, which is made up of eminent St. Louis physicians, have been used whenever necessary. All major surgical operations have been performed by a consulting specialist who visits the hospital daily.

The total expenditure amounted to \$99,082.05.

Marine hospital, San Francisco, Calif.—Surg. R. H. Creel in charge. A new and larger marine hospital authorized by the act of March 5, 1929, at a cost of \$1,640,000, will relieve overcrowded conditions in the old hospital, which was operated to the limit of its capacity during the year, a total of 3,221 patients having been admitted. The limit of the amount of relief that can be granted in the present buildings with the personnel now supplied has been reached. Seven thousand surgical operations were performed, including 48 appendectomies,

24 amputations, 157 repairs of hernias, and 160 fracture cases. In the urological section 3,072 intravenous injections of arsenicals were given and 125 cystoscopies performed. In the eye, ear, nose, and throat section 66 submucous resections, 10 cataract operations, and 360 tonsillectomies were performed. In the dental section there were 12,184 treatments and 4,440 extractions, 18 fractured jaws were treated, 30 alveolectomies performed, and 212 full dentures made. One hundred and one tuberculous patients were admitted, of whom 16 were transferred to the marine hospital at Fort Stanton, N. Mex. Unfortunately, many tuberculous patients apply for treatment in the latter stages of the disease when they are unsuitable for treatment at Fort Stanton. In the physiotherapy section 41,490 treatments were given. The clinical laboratory made 17,940 examinations which included 3,735 blood Wassermanns, 273 tests of spinal fluid, and 239 gastric analyses. The X-ray laboratory made 12,423 exposures. There were 100 deaths and 46 autopsies.

The social-welfare work was carried on by the Seamen's Church Institute.

The total expenditure amounted to \$433,221.91.

Marine hospital, Savannah, Ga.—Surg. W. M. Bryan in charge. The hospital was operated over capacity most of the year, during which there were treated 1,539 patients, of whom 570 were beneficiaries of the Veterans' Bureau. There were 5,814 dental treatments, 2,681 X-ray exposures, 12,738 laboratory examinations, and 7,567 physiotherapy treatments. Ethylene gas is included among the general anesthetics used, but local anesthesia was employed in the majority of surgical operations.

By a rearrangement of facilities and the purchase of new equipment, the hospital is now able to serve satisfactorily its increased clientele. The cafeteria system of serving has been introduced, and unfinished space in the basement converted into treatment rooms.

The total expenditure amounted to \$195,013.47.

Marine hospital, Stapleton, N. Y.—Senior Surg. M. J. White in charge. This hospital has completed 100 years of service to seamen and other beneficiaries. Overcrowding is relieved by the transfer of patients to the marine hospital at Ellis Island, and discharges are expedited in order that service may be rendered to the largest number practicable. During the year 3,932 patients were treated in hospital and 2,601 as out-patients. There were 2,928 surgical operations; spinal analgesia was used extensively and the results were quite satisfactory. In the dental section 14,253 treatments were given and 28 patients with fracture of the jaw were treated. The physiotherapy department gave 29,492 treatments to 2,787 patients. The X-ray department made 8,405 exposures. The clinical laboratory examined 15,475 specimens, including 3,350 for Wassermann reactions. There were 80 deaths and 31 autopsies.

During the last session of Congress an appropriation of \$275,000 was made and a total expenditure of \$2,500,000 authorized for new hospital buildings and the purchase of additional land. A board of medical officers convened for a study of the advantages of the present site recommended a continuance of the hospital in its present location.

The total expenditure amounted to \$442,809.53.

Marine hospital, Vineyard Haven, Mass.—Surg. J. T. Burkhalter in charge. This hospital, which was first opened in 1879, has been

filled to capacity throughout the year. In addition to serving merchant seamen, for which it was originally opened, there are five life-saving stations, one Coast Guard base, six lighthouses, and four light vessels in its vicinity. Medical and surgical service of highly specialized character customary at the larger marine hospitals is not supplied, but the quality of the service is equal to the average in the community. One medical officer furnishes all hospital and out-patient treatment and is also in charge of quarantine and immigration activities.

The total expenditure amounted to \$37,628.81.

Relief station, Galveston, Tex.—Acting Asst. Surg. E. M. F. Stephen in charge. This station is located in the customhouse, where five rooms are set apart for the use of the Public Health Service. Port sanitary statements, medicinal-liquor permits, and narcotic permits are issued to vessels, instruction is given in first aid and ship sanitation, and medical relief is furnished by radio to ships at sea. During the year 4,601 patients were treated; 11 requiring prolonged care and treatment were sent to the marine hospital, New Orleans, La., for reasons of economy. Two tuberculous patients were transferred to the marine hospital, Fort Stanton, N. Mex.

Construction of the marine hospital to be erected at this port has not been started, but the site has been purchased and the title approved and plans are in course of preparation by the Supervising Architect of the Treasury Department.

Relief station, Jacksonville, Fla.—Acting Asst. Surg. R. S. Wynn in charge. Of 817 patients treated, 96 who could not be transferred to the nearest marine hospital or who needed only a day or two of hospital treatment were placed in contract hospital. Out-patient work has increased. All alien deportees of the immigration service for the State of Florida have been examined before leaving Jacksonville, sometimes in the county jail, and sick deportees were given hospital or office treatment. A number of injured Government employees were treated for the Employees' Compensation Commission and longshoremen were examined to determine disputed disability. All seamen signing on Shipping Board boats are first examined at this station. Assistance has been rendered to both the Army and Navy recruiting offices, especially the latter, which does not maintain a medical officer.

Relief station, Los Angeles, Calif.—Surg. R. H. Heterick in charge. Many injured Federal employees are treated here at the request of the Employees' Compensation Commission. The Post Office Department furnishes the greatest number of patients, as it has more than 3,000 local employees. The Department of Agriculture sends many patients, particularly those employed by the Forest Service in fighting forest fires. The Immigration Service, Bureau of Prohibition, Coast Guard, Coast and Geodetic Survey, Lighthouse Service, Bureau of Internal Revenue, Weather Bureau, and naval petroleum reserve all send patients. Candidates were examined for the Reserve Corps of the Army, and applicants to citizens' military training camps and Naval Academy and Coast Guard candidates were vaccinated. A total of 705 patients were treated in contract hospitals by the medical officer in charge of the station, and 7,686 out-patient treatments were furnished.

Relief station, Manila, P. I.—Surg. R. W. Hart in charge. Hospital relief for American merchant seamen and other beneficiaries was

furnished in the Philippine Islands only at the port of Manila, where 228 patients were admitted to contract care during the year. The number of hospital patients does not average over 20, and hence the maintenance of a marine hospital is unnecessary. Out-patient offices were maintained at the ports of Manila, Cebu, and Iloilo. At these three ports medical treatment is furnished by the physicians detailed as quarantine officers, who furnish relief in addition to their other duties. The out-patient dispensaries are located in the customhouses at Manila and Iloilo and in the quarantine office building at Cebu.

Relief station, San Juan, P. R.—Surg. L. E. Hooper in charge. The relief station is well located and is very convenient for all of the shipping companies and vessels in the harbor. Most of the patients were merchant seamen, but a considerable number of Employees' Compensation Commission cases have also been treated. A total of 858 patients were treated.

The Insular Department of Health has continued its cordial relations with this office and the facilities of their laboratories have been freely used during the year. Cordial relations and cooperation have also been maintained with the School of Tropical Medicine, United States Army, United States Navy, Veterans' Bureau, and all other branches of the Government.

Relief station, Seattle, Wash.—Senior Surg. L. D. Fricks in charge. The Seattle relief station ranks high in the volume and quality of out-patient relief furnished at second-class stations. The out-patient office is arranged with three separate examining rooms, a separate dental office, and a rest room with two beds for very sick patients. In addition there is a staff of very able consultants. The number of cases sent to contract hospital is greater than it should be, for two reasons: First, the Port Townsend Marine Hospital, which is 50 miles from the out-patient office, has frequently been filled to its capacity of 100 beds during the year, and when this occurred it was necessary to take care of the overflow in Seattle. It also frequently happens that emergency cases and gravely ill patients must be sent to contract hospitals because of the danger which would attend their transfer to Port Townsend.

A site has been obtained for a new marine hospital at Seattle. The property, consisting of approximately 12 acres, beautifully and centrally located, was given to the Government by the city of Seattle. The Seattle Chamber of Commerce generously and at considerable expense provided an abstract of the title.

Relief station, Southport, N. C.—Acting Asst. Surg. J. Arthur Doshier in charge. An emergency ward at this combined relief and quarantine station was equipped in 1923 with furniture from the closed marine hospital at Wilmington, N. C., and to this ward were brought the 28 survivors of the crew of the American tank steamer *Shreveport*, which was destroyed at sea on September 12, 1928. It was the first time that this station has been called upon to meet such an emergency, but all patients were properly quartered, meals were served, and treatment was furnished with commendable zeal and efficiency, the station force being assisted by local State and county officials.

Supply station, Perry Point, Md.—Chief Pharmacist R. D. Kinsey in charge. The supply station continues to perform efficiently its function of serving as a depot for the receipt, storage, and shipment of supplies and equipment for the marine hospitals and other relief stations. During the fiscal year 2,603 lots of supplies were shipped,

made up of 8,381 packages of 608,003 pounds total weight. The value of all supplies and equipment handled was \$302,606.16; the total expenditure for maintenance of the station was \$29,836.07, or 9.86 per cent of the value of goods received and shipped. The value of the stock on hand December 31, 1928, was \$543,508.66.

In addition to the finished stock procured, large quantities of standard medicinal preparations were manufactured and packed for issue.

At a community fair held at the local Veterans' Bureau hospital in September, 1928, the Public Health Service was represented by an exhibit installed by the force of the supply station and displayed by the officer in charge of the station and an assistant.

Thanks are due the local station of the Veterans' Bureau for many courtesies.

The following tables give the consolidated and detailed reports for the marine hospitals and relief stations.

Consolidated X-ray report, marine hospitals and second-class relief stations

Number of patients examined.....	40, 517
Number of exposures:	
Chest.....	8, 564
Bone and joint.....	36, 316
Dental.....	12, 101
Gastrointestinal and urogenital tracts.....	10, 186
Miscellaneous.....	4, 166
Total.....	71, 333

Consolidated marine hospital laboratory report

<i>Blood</i>		<i>Spinal fluid—Continued</i>	
Complement fixation—		Cell count.....	864
Syphilis.....	51, 654	Bacteriological examination.....	98
Gonorrhea.....	368	Other examinations.....	31
Erythrocyte counts.....	5, 718		
Leucocyte counts.....	8, 760	<i>Bacteriological examinations</i>	
Differential leucocyte counts.....	6, 121	Pus.....	817
Malaria.....	3, 092	Exudates.....	391
Typing.....	538	Transudates.....	94
Blood cultures.....	356	Discharges—	
Chemical determinations—		Urethral.....	20, 832
Creatinine.....	251	Other.....	2, 380
Hydrogen ion concentration.....	15	Treponema pallidum—	
Incoagulable nitrogen.....	219	Dark field.....	2, 307
Sugar.....	1, 709	Smear.....	136
Urea nitrogen.....	301	Throat smears.....	1, 406
Uric acid nitrogen.....	106	Cultures—	
Total nitrogen.....	141	Throat.....	729
Cholesterol.....	22	Other.....	943
Hemoglobin.....	5, 767	Bacteriological counts.....	43
Chlorides.....	67		
Unclassified.....	210	<i>Typhoid and paratyphoid examinations</i>	
Coagulation time.....	3, 264	Agglutination tests.....	383
		Feces.....	242
<i>Urine</i>		Urine.....	136
Urinalyses.....	94, 311		
Renal function tests.....	802	<i>Water analysis</i>	
Quantitative sugar.....	3, 737	Chemical.....	97
		Bacteriological.....	58
<i>Feces</i>		<i>Animal inoculations</i>	
Parasites and ova.....	7, 547	For diagnosis.....	211
Dysentery.....	365	Preparation of immune sera.....	7
Metabolic examination.....	100		
Occult blood.....	1, 139	<i>Pathological examinations</i>	
<i>Sputum</i>		Autopsies.....	230
Tubercle bacillus.....	21, 436	Tissue examinations.....	1, 481
Pneumococcus.....	229		
Other organisms.....	210	<i>Vaccines</i>	
<i>Stomach or duodenal contents</i>		Autogenous.....	460
Routine.....	936		
Special.....	37	<i>Miscellaneous examinations</i>	
<i>Spinal fluid</i>		Otherwise unclassified.....	11, 707
Wassermann.....	951	Total examinations.....	267, 737
Colloidal gold reaction.....	370		
Globulin test.....	805		

Consolidated report of surgical procedures at marine hospitals and other relief stations

Amputation, all or in part.....	317	Kidney and bladder, operations on.....	90
Appendectomy.....	998	Lymphadenectomy.....	86
Arthrectomy.....	6	Mastoid operations.....	204
Arthroplasty.....	10	Nerves, operations on.....	16
Arthroscopy.....	16	Osteotomy.....	48
Aspiration.....	415	Plastic repair.....	121
Blood vessels, operations on.....	419	Pneumothorax, artificial.....	722
Bone graft.....	16	Puncture of, unclassified.....	1,991
Cauterization.....	352	Repair of, unclassified.....	130
Cholecystectomy.....	31	Resection of, unclassified.....	108
Cholecystomy.....	17	Sequestrotomy.....	20
Circumcision.....	706	Sinustomy.....	100
Cystoscopy.....	721	Skin grafting.....	34
Dilatation of, unclassified.....	914	Spinal puncture.....	705
Excision of, unclassified.....	1,465	Stomach, operations on.....	57
Exploratory incision.....	130	Submucous resection.....	321
Extraction of teeth.....	23,190	Testicle, operations on.....	83
Eye, operations on.....	232	Thyroidectomy.....	26
Foreign body, removal of.....	3,862	Tonsillectomy.....	2,464
Fracture, closed.....	934	Turbineotomy.....	127
Fracture, open.....	184	Urethrotomy.....	73
Hemorrhoids.....	634		
Hernia.....	1,638	Total.....	50,621
Hydrocele.....	143	Miscellaneous.....	3,460
Incision and drainage.....	5,490		
Intestines, operations on.....	220	Grand total.....	54,081
Joint dislocation.....	65		

TABLE 1.—Number of patients treated annually, 1868 to 1929¹

Fiscal year	Sick and disabled patients furnished relief	Fiscal year	Sick and disabled patients furnished relief
Prior to reorganization:		After reorganization—Continued:	
1868.....	11,535	1899.....	55,489
1869.....	11,356	1900.....	56,355
1870.....	10,560	1901.....	58,381
After reorganization:		1902.....	56,310
1871.....	14,256	1903.....	58,573
1872.....	13,156	1904.....	58,556
1873.....	13,529	1905.....	57,013
1874.....	14,356	1906.....	54,363
1875.....	15,009	1907.....	55,129
1876.....	16,808	1908.....	54,301
1877.....	15,175	1909.....	53,704
1878.....	18,223	1910.....	51,443
1879.....	20,922	1911.....	52,209
1880.....	24,860	1912.....	51,078
1881.....	32,613	1913.....	50,604
1882.....	36,184	1914.....	53,226
1883.....	40,195	1915.....	55,782
1884.....	44,761	1916.....	58,357
1885.....	41,714	1917.....	64,022
1886.....	43,822	1918.....	71,614
1887.....	45,314	1919.....	79,863
1888.....	48,203	1920.....	110,907
1889.....	49,518	1921.....	144,344
1890.....	50,671	1922.....	153,633
1891.....	52,992	1923 ²	126,956
1892.....	53,610	1924.....	159,686
1893.....	53,317	1925.....	204,944
1894.....	52,803	1926.....	245,140
1895.....	52,643	1927.....	249,973
1896.....	53,804	1928.....	240,592
1897.....	54,477	1929.....	260,552
1898.....	52,709		

¹ These figures do not include patients treated in connection with veterans' relief activities of the service as follows: 1918, 192; 1919, 13,856; 1920, 279,036; 1921, 667,832; 1922, 242,379; 1923, 9,704; 1924, 3,414; 1925, 4,360; 1926, 3,749; 1927, 2,830; 1928, 3,448; and 1929, 4,907.

² In this year the practice of recounting out-patients applying for treatment in more than one calendar month was discontinued.

TABLE 2.—*Transactions at United States marine hospitals and other relief stations, fiscal year 1929*

	Total number of patients treated	Number of patients treated in hospitals	Died	Patients remaining in hospital June 30, 1929	Number of days' relief in hospital	Number of patients furnished office relief	Number of times office relief was furnished	Number of physical examinations
Grand total.....	265,459	44,461	1,058	3,900	1,462,715	220,998	741,103	114,272
FIRST-CLASS STATIONS								
MARINE HOSPITALS								
Baltimore, Md.....	9,150	2,042	56	203	73,306	7,108	28,751	3,173
Boston, Mass.....	7,541	2,117	31	130	56,094	5,424	21,326	5,090
Buffalo, N. Y.....	4,093	867	31	82	28,804	3,226	11,969	1,968
Carville, La.....	724	351	13	303	109,685	373	509	2
Chicago, Ill.....	40,424	1,328	41	156	62,497	39,096	81,631	1,938
Cleveland, Ohio.....	3,906	1,070	32	81	30,849	2,836	7,405	1,353
Detroit, Mich.....	2,767	829	29	81	28,382	1,938	6,704	2,301
Ellis Island, N. Y.....	5,997	5,411	66	357	133,876	586	1,087	393
Evansville, Ind.....	398	350	15	61	19,953	48	66	70
Fort Stanton, N. Mex.....	987	393	29	232	86,944	594	1,693	65
Key West, Fla.....	1,001	579	16	80	25,637	422	1,796	95
Louisville, Ky.....	1,057	772	28	48	23,620	285	886	425
Memphis, Tenn.....	1,876	608	8	56	19,772	1,268	4,485	1,301
Mobile, Ala.....	3,182	1,040	14	89	31,673	2,142	6,003	3,302
New Orleans, La.....	11,970	3,537	83	306	114,045	8,433	27,836	7,062
New York, N. Y.....	23,897					23,897	126,628	16,517
Norfolk, Va.....	8,017	2,534	65	219	76,844	5,483	16,161	4,501
Pittsburgh, Pa.....	1,906	736	38	70	26,859	1,170	3,751	874
Portland, Me.....	1,861	806	19	48	22,862	1,055	2,308	407
Port Townsend, Wash.....	1,261	933	34	89	33,931	268	867	116
St. Louis, Mo.....	1,382	491	24	38	22,636	891	6,194	1,216
San Francisco, Calif.....	14,691	3,194	98	293	105,105	11,497	48,445	3,401
Savannah, Ga.....	3,272	1,517	36	148	54,270	1,755	5,338	1,610
Stapleton, N. Y.....	6,599	3,922	79	279	100,409	2,677	10,231	366
Vineyard Haven, Mass.....	404	182	3	24	8,922	222	374	23
Contract overflow hospitals.....	141	141	7	38	14,092			
Total.....	158,504	35,810	895	3,511	1,311,067	122,694	422,444	57,569
SECOND, THIRD, AND FOURTH CLASS STATIONS, ETC.								
Aberdeen, Wash.....	492	56	1	5	650	436	564	101
Albany, N. Y.....	120	15	2	1	118	105	383	254
Apalachicola, Fla.....	50	11			118	39	151	
Ashland, Wis.....	89	23		2	372	66	159	36
Ashtabula, Ohio.....	330	53	4	3	730	277	607	28
Astoria, Oreg.....	663	109	1	2	1,040	554	1,518	277
Balboa Heights, Canal Zone.....	812	354	8	13	5,748	458	560	
Bangor, Me.....	59	7			68	52	99	88
Bath, Me.....	11	2			2	9	30	3
Bay City, Mich.....	42	2			10	40	177	
Beaufort, N. C.....	475	88	1	3	876	387	2,127	56
Beaufort, S. C.....								
Bellingham, Wash.....	292	7			50	285	425	697
Biloxi, Miss.....	139	10			87	129	198	162
Boothbay Harbor, Me.....	46	12	1		131	34	47	28
Bridgeport, Conn.....	25	10	1		88	15	47	1
Brunswick, Ga.....	71	13	1		110	58	138	32
Burlington, Iowa.....	21	13		1	123	8	13	5
Cairo, Ill.....	530	133	1	3	1,827	397	1,112	67
Calais, Me.....								
Cambridge, Md.....	59	32			308	27	56	
Cape May, N. J.....	1,245	94			574	1,151	2,811	255
Charleston, S. C.....	929	143	4	4	990	786	1,732	328
Chattanooga, Tenn.....								
Chincoteague, Va.....	221					221	381	42
Cincinnati, Ohio.....	146	56		2	608	90	238	384
Cordova, Alaska.....	143	40		1	444	103	291	6
Crisfield, Md.....	1,068	11	1		55	1,057	3,177	12
Duluth, Minn.....	615	109	2	5	1,244	506	720	192
Eastport, Me.....	28					8	79	5
Edenton, N. C.....	8					8	34	1
Elizabeth City, N. C.....	112	6			27	106	418	27
El Paso, Tex.....	129	21	1	2	613	108	858	109
Erie, Pa.....	488	69	4	2	756	419	1,795	83
Escanaba, Mich.....	36	16			244	20	21	7
Eureka, Calif.....	199	32			458	167	271	54

TABLE 2.—*Transactions at United States marine hospitals and other relief stations fiscal year 1929—Continued*

	Total number of patients treated	Number of patients treated in hospitals	Died	Patients remaining in hospital June 30, 1929	Number of days' relief in hospital	Number of patients furnished office relief	Number of times office relief was furnished	Number of physical examinations
SECOND, THIRD, AND FOURTH CLASS STATIONS, ETC.—CON.								
Everett, Wash.	260	36	—	1	454	224	288	5
Fall River, Mass.	91	1	—	—	15	90	261	9
Gallipolis, Ohio	118	38	—	—	506	80	270	—
Galveston, Tex.	5,380	779	8	29	11,442	4,601	11,557	3,555
Georgetown, S. C.	70	—	—	—	70	70	220	2
Gloucester, Mass.	488	21	—	1	249	467	1,131	206
Grand Haven, Mich.	132	16	2	1	120	116	180	59
Green Bay, Wis.	70	9	—	—	86	61	102	22
Gulfport, Miss.	50	8	1	—	43	42	57	—
Hancock, Mich.	72	2	—	—	11	70	104	76
Hartford, Conn.	20	20	1	—	338	—	—	—
Honolulu, Hawaii	1,059	297	5	7	2,623	762	1,597	864
Houston, Tex.	1,607	262	1	7	4,226	1,345	4,272	1,586
Jacksonville, Fla.	739	72	2	2	730	667	1,871	459
Juneau, Alaska	288	66	—	1	903	222	256	39
Ketchikan, Alaska	945	225	6	5	3,186	720	1,166	27
La Crosse, Wis.	28	2	—	—	7	26	44	32
Lee Hall, Va.	1,440	—	—	—	—	1,440	2,064	253
Lewes, Del.	256	27	2	1	245	229	611	36
Los Angeles, Calif.	1,427	428	2	19	8,804	999	7,686	678
Ludington, Mich.	175	15	2	1	228	160	554	61
Machias, Me.	24	—	—	—	—	24	60	24
Manila, P. I.	1,910	236	2	13	4,848	1,674	3,243	1,261
Manistee, Mich.	83	15	1	1	157	68	491	12
Manitowoc, Wis.	255	66	—	—	762	189	317	33
Marquette, Mich.	267	28	—	3	332	239	535	59
Marshfield, Oreg.	144	22	—	—	198	122	162	43
Menominee, Mich.	60	4	—	—	13	56	162	14
Miami, Fla.	327	25	—	—	233	302	580	321
Milwaukee, Wis.	963	205	1	3	2,106	758	2,036	754
Morehead City, N. C.	182	62	3	4	678	120	716	5
Nantucket, Mass.	108	4	—	—	22	104	197	17
Nashville, Tenn.	39	1	—	—	17	38	83	47
Natchez, Miss.	278	62	1	—	1,060	216	465	22
New Bedford, Mass.	330	18	1	—	273	312	647	217
New Bern, N. C.	231	72	1	1	689	159	268	45
New Haven, Conn.	90	11	—	—	160	79	222	110
New London, Conn.	456	44	2	1	556	412	734	77
Newport, Ark.	14	—	—	—	—	14	27	16
Newport, Oreg.	85	2	—	—	39	83	202	8
Newport, R. I.	294	40	1	2	382	254	433	36
Newport News, Va.	294	—	—	—	—	294	397	159
Nome, Alaska	22	4	—	—	58	18	37	4
Ogdensburg, N. Y.	75	12	—	—	193	63	111	42
Oswego, N. Y.	182	17	—	—	199	165	350	59
Paducah, Ky.	265	29	—	—	364	236	923	21
Panama City, Fla.	72	18	—	—	180	54	123	1
Pensacola, Fla.	439	87	2	6	659	352	1,049	158
Perth Amboy, N. J.	67	9	—	—	81	58	113	7
Petersburg, Alaska	189	6	—	—	38	183	756	6
Philadelphia, Pa.	5,421	670	7	21	6,127	4,751	19,070	7,108
Ponce, P. R.	111	31	—	5	1,006	80	173	22
Port Angeles, Wash.	231	29	—	—	145	202	385	107
Port Arthur, Tex.	1,334	155	6	2	1,427	1,179	2,308	347
Port Huron, Mich.	257	14	1	1	93	243	546	140
Portland, Oreg.	1,535	308	4	7	4,816	1,227	3,391	1,605
Portsmouth, N. H.	6	3	—	—	40	3	4	1
Providence, R. I.	407	37	1	—	421	370	725	383
Provincetown, Mass.	137	—	—	—	—	137	305	61
Reedville, Va.	256	—	—	—	—	256	450	1
Richmond, Va.	116	21	1	—	309	95	170	87
Rock Island, Ill.	1,666	21	1	—	98	1,645	6,383	1,963
Saginaw, Mich.	5	—	—	—	—	5	34	—
St. Thomas, Virgin Islands	91	4	—	1	38	87	212	1
San Diego, Calif.	331	42	2	6	1,241	289	1,176	716
Sandusky, Ohio	62	8	2	—	86	54	79	8
San Juan, P. R.	696	150	4	12	3,183	546	1,492	84
San Pedro, Calif.	5,002	395	13	11	5,181	4,607	9,809	655
Sault Ste. Marie, Mich.	909	187	3	12	1,574	722	1,475	156
Seattle, Wash.	5,680	227	13	3	2,474	5,453	12,614	11,915
Sheboygan, Wis.	87	3	1	—	15	84	300	18
Sitka, Alaska	95	9	—	—	116	86	129	—

TABLE 2.—*Transactions at United States marine hospitals and other relief stations fiscal year 1929—Continued*

	Total number of patients treated	Number of patients treated in hospitals	Died	Patients remaining in hospital June 30, 1929	Number of days' relief in hospital	Number of patients furnished office relief	Number of times office relief was furnished	Number of physical examinations
SECOND, THIRD, AND FOURTH CLASS STATIONS, ETC.— <i>Con.</i>								
Solomons, Md.-----	179	5	-----	-----	45	174	251	34
South Bend, Wash.-----	68	22	-----	-----	180	46	120	30
Southport, N. C.-----	478	45	-----	-----	353	433	728	50
Superior, Wis.-----	375	59	-----	2	551	316	527	21
Tacoma, Wash.-----	360	41	-----	3	440	319	777	205
Tampa, Fla.-----	544	65	2	2	780	479	799	180
Toledo, Ohio.-----	697	117	3	4	1,745	580	1,237	292
Vicksburg, Miss.-----	351	53	1	-----	338	298	1,104	92
Washington, D. C.-----	2,961	163	3	7	2,006	2,798	24,470	7,487
Washington, D. C. (dental clinic).-----	1,244	-----	-----	-----	-----	1,244	12,011	-----
Washington, N. C.-----	186	29	-----	-----	221	157	247	8
White Stone, Va.-----	500	-----	-----	-----	-----	500	2,703	16
Wilmington, Del.-----	39	1	-----	-----	2	88	76	67
Wilmington, N. C.-----	451	25	-----	-----	186	423	1,381	130
Wrangell, Alaska.-----	50	12	-----	1	121	38	72	10
MISCELLANEOUS								
Black Mountain, N. C.-----	2	2	1	1	395	-----	-----	-----
Curtis Bay, Md.-----	1,335	-----	-----	-----	-----	1,335	9,460	294
St. Elizabeths Hospital, Washington, D. C.-----	141	141	6	124	43,418	-----	-----	-----
Contract physicians for U. S. Coast Guard and Lighthouse Service.-----	4,846	131	2	-----	1,020	4,715	13,673	2,591
U. S. Coast Guard vessels and bases.-----	35,446	417	6	6	4,003	35,029	116,584	4,902
Emergency.-----	114	39	-----	-----	472	75	242	24
Examinations abroad for U. S. Veterans Bureau.-----	-----	-----	-----	-----	-----	-----	-----	5
Total.-----	106,955	8,651	163	389	151,648	98,304	318,659	56,703
Graud total.-----	265,459	44,461	1,058	3,900	1,412,713	220,997	741,103	114,272

TABLE 3.—Relief furnished at United States Marine hospitals and other relief stations, fiscal year 1929, classified by beneficiary

Beneficiary	Class of station	Total number of patients treated	Number of patients treated in hospital	Died	Patients remaining in hospital June 30, 1929	Number of days' relief in hospital	Number of patients furnished relief	Number of times office was furnished	Number of physical examinations
American seamen	First-class stations	84,479	20,588	578	2,186	821,172	63,891	259,282	17,685
	Other relief stations	44,120	5,960	130	303	113,501	38,160	92,572	8,548
	Total	128,599	26,548	708	2,489	934,673	102,051	351,854	26,233
Foreign seamen	First-class stations	700	510	12	26	11,934	190	372	114
	Other relief stations	194	75	2	5	1,859	119	182	1
	Total	894	585	14	31	13,793	309	554	115
U. S. Coast Guard	First-class stations	7,985	3,183	18	208	74,921	4,782	17,623	6,451
	Other relief stations	6,984	689	1	21	8,512	6,265	22,038	3,793
	Contract physicians	4,698	129	1	1	1,007	4,569	13,270	2,583
	Coast Guard vessels and bases	35,446	417	6	6	4,003	35,029	116,584	4,902
	Emergency	85	33	—	—	427	52	162	19
	Total	55,148	4,451	26	235	88,870	50,697	169,697	17,748
U. S. Bureau of Fisheries	First-class stations	13	8	—	—	121	5	82	—
	Other relief stations	20	1	—	—	1	19	35	—
	Total	33	9	—	—	122	24	117	—
U. S. Army	First-class stations	165	34	1	—	408	131	469	136
	Other relief stations	62	12	—	—	108	50	116	97
	Total	227	46	1	—	516	181	585	233
U. S. Navy and Marine Corps	First-class stations	136	62	1	1	923	74	330	4
	Other relief stations	50	20	1	3	312	30	55	7
	Total	186	82	2	4	1,235	104	385	11
Mississippi River Commission	First-class stations	102	45	2	6	2,008	57	179	3
	Other relief stations	34	6	—	—	34	28	61	1
	Total	136	51	2	6	2,042	85	240	4

Seamen, U. S. Engineer Corps and Army Transport Service.	First-class stations.....	2, 105	771	22	69	29, 035	1, 394	4, 262	43
	Other relief stations.....	1, 464	295	5	7	3, 364	1, 169	3, 585	79
	Total.....	3, 569	1, 066	27	76	32, 399	2, 503	7, 847	122
U. S. Lighthouse Service.	First-class stations.....	987	302	11	17	8, 382	685	2, 074	139
	Other relief stations.....	938	113	4	4	2, 000	825	2, 039	136
	Contract physicians.....	148	2	1	-----	13	146	403	8
	Emergency.....	11	4	-----	-----	27	7	44	2
	Total.....	2, 084	421	16	21	10, 422	1, 663	4, 560	285
U. S. Coast and Geodetic Survey.	First-class stations.....	254	70	-----	-----	1, 336	184	383	130
	Other relief stations.....	583	39	1	-----	283	544	2, 257	335
	Emergency.....	18	2	-----	-----	18	16	36	3
	Total.....	855	111	1	2	1, 637	744	2, 676	477
U. S. Employees' Compensation Commission.	First-class stations.....	47, 924	1, 678	11	129	43, 077	46, 246	113, 743	13, 020
	Other relief stations.....	9, 032	775	8	31	13, 495	8, 257	53, 536	5, 523
	Total.....	56, 956	2, 453	19	160	56, 572	54, 503	167, 279	19, 143
U. S. Veterans' Bureau.	First-class stations.....	4, 895	4, 662	208	421	155, 546	233	2, 779	74
	Other relief stations.....	12	1	-----	-----	7	11	20	24
	Abroad.....	-----	-----	-----	-----	-----	-----	-----	5
	Total.....	4, 907	4, 663	208	421	155, 553	244	2, 799	103
U. S. Immigration Service.	First-class stations.....	3, 257	2, 941	11	129	44, 257	316	564	123
	Other relief stations.....	266	75	3	9	2, 044	191	849	231
	Total.....	3, 523	3, 016	14	138	46, 901	507	1, 413	354
U. S. Public Health Service, officers and employees.	First-class stations.....	4, 543	593	7	14	8, 010	3, 950	18, 840	837
	Other relief stations.....	1, 155	2	-----	-----	25	1, 153	8, 549	79
	Total.....	5, 698	595	7	14	8, 035	5, 103	27, 389	916
Lepers.	First-class stations.....	360	358	13	303	109, 743	2	6	-----
	Other relief stations.....	3	-----	-----	-----	-----	3	6	-----
	Total.....	363	358	13	303	109, 743	5	12	-----
Pilots.	First-class stations.....	-----	-----	-----	-----	-----	-----	-----	3, 632
	Other relief stations.....	-----	-----	-----	-----	-----	-----	-----	1, 924
	Total.....	-----	-----	-----	-----	-----	-----	-----	5, 556
Citizens' military training camps.	First-class stations.....	170	-----	-----	-----	-----	170	507	181
	Other relief stations.....	176	-----	-----	-----	-----	176	470	367
	Total.....	346	-----	-----	-----	-----	346	977	548

TABLE 3.—Relief furnished at United States Marine hospitals and other relief stations, fiscal year 1929, classified by beneficiary—Continued

Beneficiary	Class of station	Total number of patients treated	Number of patients treated in hospital	Died	Patients remaining in hospital June 30, 1929	Number of days' relief in hospital	Number of patients furnished relief	Number of times office relief was furnished	Number of physical examinations
Food handlers.	First-class stations.	-----	-----	-----	-----	-----	-----	-----	1,724
	Other relief stations.	-----	-----	-----	-----	-----	-----	-----	109
	Total.	-----	-----	-----	-----	-----	-----	-----	1,833
U. S. Civil Service applicants and employees.	First-class stations.	-----	-----	-----	-----	-----	-----	-----	9,068
	Other relief stations.	-----	-----	-----	-----	-----	-----	-----	10,774
	Total.	-----	-----	-----	-----	-----	-----	-----	19,842
Postal employees.	First-class stations.	-----	-----	-----	-----	-----	-----	-----	650
	Other relief stations.	-----	-----	-----	-----	-----	-----	-----	307
	Total.	-----	-----	-----	-----	-----	-----	-----	957
Alaska cannery workers.	First-class stations.	-----	-----	-----	-----	-----	-----	-----	-----
	Other relief stations.	1,334	-----	-----	-----	-----	1,334	1,334	11,723
	Total.	1,334	-----	-----	-----	-----	1,334	1,334	11,723
U. S. Shipping Board, for crews.	First-class stations.	-----	-----	-----	-----	-----	-----	-----	1,967
	Other relief stations.	-----	-----	-----	-----	-----	-----	-----	3,805
	Total.	-----	-----	-----	-----	-----	-----	-----	5,772
Miscellaneous.	First-class stations.	449	5	-----	-----	194	444	949	979
	Other relief stations.	152	1	1	-----	8	151	436	1,318
	Total.	601	6	-----	-----	202	595	1,385	2,297
Total.	First-class stations.	158,504	35,810	895	3,511	1,311,067	122,694	422,444	57,569
	Other relief stations.	66,549	3,064	155	383	146,153	58,485	188,160	49,181
	Contract physicians.	4,846	131	2	-----	4,020	4,715	13,673	2,591
	Coast Guard vessels and bases.	35,446	417	6	6	4,003	35,029	116,584	4,902
	Emergency.	114	39	-----	-----	-----	75	242	24
	Foreign.	-----	-----	-----	-----	-----	-----	-----	5
Grand total.	-----	265,459	44,461	1,058	3,900	1,462,715	220,998	741,103	114,272

TABLE 4.—*Causes of admission for discharged patients and condition on discharge, United States marine hospitals and other relief stations, fiscal year 1929*

Diseases or condition	Number having specified diseases or injury ¹					Condition on discharge of patients for specified diseases or injury				
	Major condition for which admitted ²	Condition second in importance	Condition third in importance ³	Sequelae to major condition	Total number of persons having each specified disease or injury	Cured	Improved	Not improved	Died	Other conditions
Abnormalities and congenital malformations.....	43	-----	-----	-----	-----	10	22	1	-----	10
Blood and blood-forming organs, diseases and injuries of.....	45	-----	-----	-----	-----	2	26	-----	5	12
Bones and cartilages, diseases and injury of.....	2, 209	-----	-----	-----	-----	467	895	2	41	804
Circulatory system, diseases and injuries of:										
Heart diseases, valvular.....	387	207	54	3	651	2	236	-----	74	75
Varicose veins.....	220	154	80	-----	454	76	106	1	-----	37
All others.....	1, 060	-----	-----	-----	-----	112	599	3	125	221
Communicable and infectious diseases, not including tuberculosis and venereal:										
Conjunctivitis, granular trachomatous.....	19	3	1	-----	23	-----	11	-----	-----	8
Dengue.....	6	-----	-----	-----	6	2	4	-----	-----	-----
Influenza.....	1, 981	94	25	-----	2, 100	1, 110	638	-----	26	207
Malaria.....	492	69	12	-----	573	88	345	-----	3	56
Rheumatic fever, acute.....	128	8	3	5	144	32	77	-----	2	17
Typhoid fever.....	59	7	2	-----	68	27	14	-----	14	4
All others.....	511	-----	-----	-----	-----	280	159	1	15	56
Dental.....	273	2, 194	1, 551	6	4, 024	56	155	-----	1	61
Digestive system, diseases and injuries of:										
Appendicitis.....	928	164	40	-----	1, 132	511	261	-----	32	124
Gastritis.....	368	56	17	11	452	117	207	-----	1	43
Hemorrhoids.....	584	261	76	1	922	298	198	-----	2	86
All others.....	1, 605	-----	-----	-----	-----	434	812	2	37	320
Ear, nose, and throat, diseases and injuries of:										
Deviation of nasal septum.....	269	244	79	-----	592	118	95	-----	-----	56
Otitis media.....	202	129	66	1	398	30	131	-----	-----	41
Tonsillitis.....	2, 427	863	127	1	3, 418	1, 358	773	-----	2	294
All others.....	887	-----	-----	-----	-----	336	405	2	4	140
Endocrines, diseases and injuries of.....	199	-----	-----	-----	-----	16	111	-----	10	62
Eye and adnexa, diseases and injuries of.....	544	-----	-----	-----	-----	132	252	3	1	156
Genito-urinary system, diseases and injuries of (exclusive of venereal):										
Nephritis.....	206	146	64	2	418	7	109	2	52	36
All others.....	1, 424	-----	-----	-----	-----	379	755	1	23	266
Hernia.....	1, 529	335	79	-----	1, 943	880	357	2	5	285
Joints and bursae, diseases and injuries of:										
Arthritis.....	780	193	67	302	1, 342	82	526	2	9	161
All others.....	453	-----	-----	-----	-----	89	213	5	1	145
Leprosy.....	54	-----	-----	-----	54	-----	19	-----	13	22
Lymphatic system, diseases and injuries of:										
Lymphadenitis.....	402	77	35	280	794	129	183	-----	-----	90
All others.....	41	-----	-----	-----	-----	7	21	-----	2	11
Muscles, fasciae, tendons, and tendon sheaths, diseases and injuries of.....	1, 296	-----	-----	-----	-----	345	611	1	2	337
Nervous system, diseases and injuries of:										
Epilepsy without psychosis.....	54	23	4	-----	81	1	36	-----	-----	17
Neuritis.....	234	57	23	5	319	32	156	2	-----	44
All others.....	486	-----	-----	-----	-----	52	241	9	28	156

¹ Except in the case of specific diseases, statistics are given only for the major condition for which admitted.² Represents number of discharges for each condition.³ Where sequelae were given, no third diagnosis was recorded.

TABLE 4.—*Causes of admission for discharged patients and condition on discharge, United States marine hospitals and other relief stations, fiscal year 1929—Con.*

Diseases or condition	Number having specified diseases or injury					Condition on discharge of patients for specified diseases or injury				
	Major condition for which admitted	Condition second in importance	Condition third in importance	Sequelæ to major condition	Total number of persons having each specified disease or injury	Cured	Improved	Not improved	Died	Other conditions
Obstetric and gynecological conditions	27					12	13	1		1
Parasitic diseases:										
Uncinariasis	31	50	24		105	10	13			8
All others	134					37	73		3	21
Poisonings and intoxications:										
Alcohol (ethyl) poisoning, acute	258	31	5		294	104	105		7	42
Alcoholism, chronic (without psychosis)	66	22	4		92	14	38		2	12
All others	104					39	40		3	22
Psychiatric diseases:										
Drug addiction without psychosis	25	16	2		43	6	7		1	11
All others	338					22	141	6	8	161
Respiratory system, diseases and injuries of (exclusive of tuberculosis):										
Asthma	206	65	16		287	11	147	2	4	42
Bronchitis	772	336	66	3	1,177	210	419		7	136
Pleurisy	254	119	35	23	431	50	152		7	45
Pneumonia	383	86	59	57	585	146	90		100	47
All others	28					3	16		3	6
Skin and its appendages, diseases and injuries of	853					293	403	1	8	148
Tuberculosis:										
Tuberculosis, pulmonary	1,004	108	32	2	1,146	2	259	5	193	545
Tuberculosis (otherwise unclassified)	82	49	8	3	142	7	25	2	14	34
Tumors:										
Carcinoma	202	30	12	1	245	15	47	3	71	66
All others	296					96	109	1	10	80
Veneral diseases:										
Chancroidal infections	927	103	13	478	1,526	283	431			213
Gonococcus infections	3,174	283	51	54	3,562	369	2,003		1	801
Syphilis	2,045	925	234		3,204	29	1,300	2	44	670
All others	44					11	21			12
Inoculations	3									3
Under observation	515									515
Miscellaneous:										
Cellulitis	275	50	8	72	405	120	101		1	53
All others	3,469					1,011	1,571	3	33	851
Total	37,920					10,517	17,283	65	1,050	9,005

NOTE.—This table does not include immigration patients discharged from U. S. marine hospital, Ellis Island, N. Y.

TABLE 5.—*Causes of death in United States marine hospitals and other relief stations during fiscal year 1929*

Inter-national List No.	Cause of death	Number of deaths
PART I		
<i>I. Epidemic, endemic, and infectious diseases</i>		
1	Typhoid and paratyphoid fever.....	14
5	Malaria.....	2
10	Diphtheria.....	1
11	Influenza.....	26
16	Dysentery.....	3
20	Leprosy.....	8
21	Erysipelas.....	4
23	Lethargic encephalitis.....	1
24	Meningococcus meningitis.....	2
29	Tetanus.....	1
31	Tuberculosis of the respiratory system.....	192
32	Tuberculosis of the meninges and central nervous system.....	4
33	Tuberculosis of the intestines and peritoneum.....	4
34	Tuberculosis of the vertebral column.....	2
35	Tuberculosis of the joints.....	1
36	Tuberculosis of other organs.....	3
37	Disseminated tuberculosis.....	9
38	Syphilis.....	
41	Purulent infection, septicemia.....	
<i>II. General diseases not included in Class I</i>		
43	Cancer and other malignant tumors of the buccal cavity.....	
44	Cancer and other malignant tumors of the stomach and liver.....	28
45	Cancer and other malignant tumors of the peritoneum, intestines, and rectum.....	19
49	Cancer and other malignant tumors of other or unspecified organs.....	29
50	Benign tumors and tumors not returned as malignant.....	2
51	Rheumatic fever, acute.....	2
52	Rheumatism, chronic, osteoarthritis and gout.....	1
57	Diabetes mellitus.....	9
58	Anemia or chlorosis.....	5
60	Diseases of the thyroid gland.....	2
65	Leukemia and Hodgkins disease.....	2
66	Alcoholism, acute and chronic.....	10
68	Poisoning, chronic by organic substances.....	1
69	Other general diseases.....	1
<i>III. Diseases of the nervous system and of the organs of special sense</i>		
70	Encephalitis.....	3
71	Meningitis.....	12
72	Tabes dorsalis (locomotor ataxia).....	4
74	Cerebral hemorrhage, apoplexy.....	30
75	Paralysis without specified cause.....	5
76	General paralysis of the insane.....	2
77	Other forms of mental alienation.....	2
84	Other diseases of the nervous system.....	2
86	Diseases of the ear and of the mastoid process.....	1
<i>IV. Diseases of the circulatory system</i>		
87	Pericarditis.....	4
88	Endocarditis and myocarditis (acute).....	10
89	Angina pectoris.....	3
90	Other diseases of the heart.....	136
91	Diseases of the arteries.....	29
92	Embolism and thrombosis (not cerebral).....	3
95	Hemorrhage without specified cause.....	2
96	Other diseases of the circulatory system.....	1
<i>V. Diseases of the respiratory system</i>		
99	Bronchitis.....	4
100	Broncho-pneumonia.....	41
101	Pneumonia.....	79
102	Pleurisy.....	6
105	Asthma.....	3
107	Other diseases of the respiratory system.....	7

TABLE 5.—*Causes of death in United States marine hospitals and other relief stations during fiscal year 1929—Continued*

Inter- national List No.	Cause of death	Number of deaths
PART I—Continued		
VI. Diseases of the digestive system		
111	Ulcer of the stomach and duodenum.....	11
112	Other diseases of the stomach.....	6
117	Appendicitis and typhlitis.....	33
118	Hernia.....	8
119	Other diseases of the intestines.....	3
122	Cirrhosis of the liver.....	9
124	Other diseases of the liver.....	3
126	Peritonitis without specified cause.....	2
127	Other diseases of the digestive system (cancer and tuberculosis excepted).....	9
VII. Nonvenereal diseases of the genito-urinary system and adnexa		
128	Nephritis, acute.....	8
129	Nephritis, chronic.....	44
131	Other diseases of the kidneys and adnexa.....	2
133	Diseases of the bladder.....	5
134	Diseases of the urethra, urinary abscess, etc.....	3
135	Diseases of the prostate.....	10
IX. Diseases of the skin and of the cellular tissue		
151	Gangrene.....	2
154	Other diseases of the skin and adnexa.....	1
X. Diseases of the bones and of the organs of locomotion		
155	Diseases of the bone (tuberculosis excepted).....	2
156	Diseases of the joints (tuberculosis and rheumatism excepted).....	2
XIV. External causes		
165	Suicide by solid and liquid poisons (corrosive substances excepted).....	2
169	Suicide by drowning.....	1
170	Suicide by firearms.....	1
172	Suicide by jumping from high places.....	1
177	Other acute accidental poisonings (gas excepted).....	2
178	Conflagration.....	1
179	Accidental burns (conflagration excepted).....	8
184	Accidental traumatism by cutting and piercing instruments.....	3
185	Accidental traumatism by fall.....	11
187	Accidental traumatism by machines.....	2
188	Accidental traumatism by other crushing (vehicles, railways, landslides, etc.).....	1
189	Injuries by animals (not poisoning).....	1
190	Wounds of war.....	1
194	Excessive heat.....	1
197	Homicide by firearms.....	2
201	Fracture (cause not specified).....	18
XV. Ill-defined diseases		
205	Causes of death not specified or ill-defined.....	6
Total.....		1,050
Causes of death of immigrants at U. S. Marine Hospital, Ellis Island, N. Y., not included above.....		8
Grand total.....		1,058

TABLE 6.—Number of each class of beneficiary discharged from United States marine hospitals and other relief stations during the fiscal year 1929

[illegible]

TABLE 7.—Number of days in hospital for patients discharged during fiscal year 1929 from United States marine hospitals and other relief stations, by broad groups of conditions and class of beneficiary

Groups	Class of beneficiary															
	Total	Amer- ican seamen	For- eign seamen	U. S. Coast Guard	U. S. Army	U. S. Navy and Marine Corps	Missis- sippi River Com- mis- sion	Seamen, U. S. Engineer Corps Army Trans- port Service	U. S. Light- house Serv- ice	U. S. Coast and Geo- detic Survey	U. S. Em- ployees' Com- pensa- tion Com- mis- sion	U. S. Veter- ans' Bureau	U. S. Immi- gra- tion Serv- ice	U. S. Public Health Serv- ice of- ficers and em- ployees	Lepers	Mis- cel- laneous
Abnormalities and congenital malforma- tions	1,489	831		107					49		13	408	66	15		
Blood and blood-forming organs, diseases and injuries of	2,242	1,353		142				5				742				
Bones and cartilages, diseases and injuries of	95,802	58,908	1,415	3,874	9	127		1,479	324	147	18,766	9,667	4	805		277
Circulatory system, diseases and injuries of	94,248	69,123	222	2,834		15	69	2,072	1,351	7	666	17,187	16	536		150
Communicable and infectious diseases, not including tuberculosis and venereal	47,897	30,663	1,804	6,201	68	104	14	2,698	741	166	432	3,347	365	1,292		2
Dental	4,377	2,825	80	478				27	23	8	68	809	20	39		
Digestive system, diseases and injuries of	77,742	44,075	875	7,655	266	552	41	1,973	670	82	363	20,122	162	784		122
Ear, nose, and throat, diseases and inju- ries of	51,487	27,399	346	9,291		71		2,233	554	220	334	10,139	190	696		14
Endocrines, diseases and injuries of	8,904	5,239	79	222	113			1,091	114	31	38	1,977		31		
Eye and adnexa, diseases and injuries of	12,618	8,469	120	480	22	3		246	83		1,209	1,972		14		
Genito-urinary system, diseases and in- juries of (exclusive of venereal)	45,540	29,929	703	2,224		109	33	2,123	476	41	739	8,374	432	287		70
Hernia	45,638	30,167	163	2,020	18			1,016	243	171	6,350	5,416		74		
Joints and bursae, diseases and injuries of	53,364	34,471	209	3,194	2	22		1,532	351	6	3,618	9,556		165		238
Leprosy	65,901													65,901		
Lymphatic system, diseases and injuries of	12,673	9,080	448	907		65		206	71	1	269	1,343	273	10		
Muscles, fascia, tendons and tendon sheaths, diseases and injuries of	23,763	13,798	241	2,023			1	515	256	21	4,967	1,731	3	207		
Nervous system, diseases and injuries of	34,056	23,672	231	1,518				998	120		344	6,785		371		17
Obstetrics and gynecological conditions	615	339						7				148		121		
Parasitic diseases	4,367	2,972	65	378				80	37	15		775		27		18
Poisonings and intoxications	6,046	5,054	9	158	4	3		156	12	19	289	311		31		
Psychiatric diseases	29,753	21,993	38	3,794	3		43	59	1,106		631	2,086				
Respiratory system, diseases, and inju- ries of (exclusive of tuberculosis)	49,739	31,550	648	3,517	2	30		957	324	51	1,231	10,720	64	563		82

Skin and its appendages, diseases and injuries of...	19,558	14,329	335	1,734	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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NOTE.—Immigration patients at U. S. Marine Hospital, Ellis Island, N. Y., not included in this table.

TABLE 8.—*Classification of out-patient treatments furnished at United States marine hospitals and other relief stations, fiscal year 1929*

Station	General medical	Dental	Eye, ear, nose, and throat	Neuro-psychopathic	Tuber-culosis	Surgical	Veneral diseases	Inoculations and vaccinations	Arsenicals	Physiotherapy and X ray	Total
Marine Hospitals.....	44, 651	92, 879	29, 706	85	138	114, 993	63, 507	3, 010	12, 640	60, 835	422, 444
Other relief stations.....	55, 149	21, 479	11, 225	124	357	52, 405	20, 892	4, 762	3, 944	17, 823	188, 160
Contract physicians.....	7, 171	76	1, 044	70	71	2, 831	336	1, 534	32	108	13, 673
Coast Guard vessels and bases	43, 751	17, 533	12, 610	42	73	19, 621	13, 953	7, 510	214	1, 277	116, 584
Emergency.....	242										242
Grand total.....	150, 964	131, 967	54, 585	321	639	189, 850	98, 688	17, 216	16, 830	80, 943	741, 103

TABLE 9.—Nativity by beneficiary of patients discharged from United States marine hospitals and other relief stations during the fiscal year 1929

Nativity	Class of beneficiary															
	Total	Ameri- can seamen	For- eign sea- men	U. S. Coast Guard	U. S. Army	U. S. Navy and Marine Corps	Missis- sippi River Com- mission	Seamen, U. S. Engineer Corps and Army Trans- port Service	U. S. Light- house Service	U. S. Coast and Geo- detic Survey	U. S. Em- ployees Com- pensa- tion Com- mis- sion	U. S. Veter- ans' Bureau	U. S. Immi- gration and Service	U. S. Public Health Service officers and em- ployees	Lepers	Miscel- laneous
United States.....	26,190	14,880	11	3,719	41	74	21	847	238	88	1,924	3,861	1	445	25	15
Hawaii, Panama, Philippine Islands, and Porto Rico.....	1,021	830	3	101	2			25	3	10	31	4	1	6	4	
Armenia.....	7	3									1	3				
Austria.....	167	138	1	5				2			7	9	1	4		
Belgium.....	37	31	5					1								
Bohemia.....	9	6	2					1								
Bulgaria.....	3	2														
Canada.....	883	718	9	40				5	17	1	15	43	18	11		6
Central America.....	58	46	3					1			2	1	4	1		
China.....	51	21	7	1								1	18	1		
Cuba.....	27	24	2													
Denmark.....	436	331	35	25				2	2	2	7	8	21	3		
Egypt.....	20	14	1	2				2	6	4	22	19	43	13	1	2
England.....	703	482	86	17		1		7			3		3	1		
Finland.....	265	241	5	7				1	4							
France.....	72	46	8	4				1	3		1	6				
Germany.....	860	665	59	19				18	12		35	14	31	7		
Greece.....	286	241	2	9				8	1	1	1	13	5	2	2	
Holland.....	203	166	12	8		1					1	2	8	1		
Hungary.....	25	15		3				1								
India, East.....	1															
India, West.....	368	312	10	10					9	3	2	4	12	2	2	1
Ireland.....	660	509	17	15	1	1	1	11	6		31	23	8	36	1	1
Italy.....	279	136	17	8				1			23	74	13	3	4	
Japan.....	22	10	8	1												
Mexico.....	112	95	4	1							5		1	2	4	
Norway.....	1,382	1,130	99	41			1	18	26	2	7	3	51	3		1
Poland.....	198	123		10		1		2	3		3	47	3	6		
Rumania.....	35	24		1								2	2			
Russia.....	254	198	2	10				4	3		10	22	1	4		

	287	211	21	7			5	7	6	2	12	9		7
Scotland.....	7	1	5						3	1	3			
Serbia.....	48	39	13	6				2	2	1	6		1	
South Africa.....	295	263	10	5				5	3	1	14	1	1	
South America.....	446	403	49	21				14	13	5	20	9	1	
Spain.....	891	745	1	1					1			1		
Sweden.....	50	36	1	9										
Switzerland.....	13	10												
Turkey.....	1,249	857	41	82				25	114	2	1	12	7	
All others.....							22	6		35	47			
							1,007	390	2,276	4,216	355	583	54	33
Total.....	37,920	24,006	546	4,189	45	78	24	118						

TABLE 10.—*Nativity by beneficiary of patients who died in United States marine hospitals and other relief stations during the fiscal year 1929*

Nativity	Class of beneficiary													
	Total	Ameri- can seamen	For- eign sea- men	U. S. Coast Guard	U. S. Army	U. S. Navy and Marine Corps	Missis- sippi River Com- mission	Seaman, U. S. Engineer Corps and Army Trans- port Service	U. S. Light- house and Geo- detic Survey	U. S. Em- ployees' Com- pensa- tion Com- mission	U. S. Veter- ans' Bureau	U. S. Immigra- tion Service	U. S. Public Health Service officers and em- ployees	Miscel- laneous
United States.....	633	361	---	21	1	2	1	19	11	14	191	---	5	7
Hawaii, Panama, Philippine Islands, and Porto Rico.....	28	25	---	1	---	---	---	1	---	1	---	---	---	---
Armenia.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Austria.....	2	2	---	---	---	---	---	---	---	---	---	---	---	---
Belgium.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Bohemia.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Bulgaria.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Canada.....	32	27	1	---	---	---	---	---	---	---	3	---	1	---
Central America.....	1	1	---	---	---	---	---	---	---	---	---	1	---	---
China.....	7	3	2	---	---	---	---	---	---	---	---	---	1	---
Cuba.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Denmark.....	11	9	2	---	---	---	---	---	---	---	---	---	---	---
Egypt.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
England.....	29	22	3	---	---	---	---	2	---	---	2	---	---	---
Finland.....	13	13	---	---	---	---	---	---	---	---	---	---	---	---
France.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Germany.....	22	17	1	1	---	---	---	2	---	---	1	---	1	---
Greece.....	13	10	---	---	---	---	---	1	---	---	1	---	---	---
Holland.....	5	5	---	---	---	---	---	---	---	---	---	---	---	---
Hungary.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
India, East.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
India, West.....	17	17	---	---	---	---	---	---	---	---	---	---	---	---
Ireland.....	26	23	---	---	---	---	---	---	---	2	1	---	---	---
Italy.....	7	3	---	---	---	---	---	---	---	---	3	---	1	---
Japan.....	1	---	---	1	---	---	---	---	---	---	---	---	---	---
Mexico.....	2	2	---	---	---	---	---	---	---	---	---	---	---	---
Norway.....	47	42	2	---	---	---	---	---	1	1	1	---	---	---
Poland.....	6	5	---	---	---	---	---	---	---	---	---	---	---	---
Rumania.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Russia.....	11	10	---	---	---	---	---	---	1	---	---	---	---	---

	12	8	1					1	1			1				
Scotland.....																
Serbia.....																
South Africa.....	1															
South America.....	13	12														
Spain.....	24	1														
Sweden.....	34	30	1													
Switzerland.....	1															
Turkey.....																
All others.....	52	37	2		1	1	1	1	2		4					3
Total.....	1,050	708	14	26	1	2	27	16	19	208	6	7	13			

NOTE.—Immigration patients (8), who died at Ellis Island Marine Hospital, not included.

TABLE 11.—*Number of discharged American seamen admitted with specified diseases or injuries as a major condition*

Diseases or condition	Number discharged	Diseases or condition	Number discharged
Abnormalities and congenital malformations.....	27	Muscles, fasciae, tendons, and tendon sheaths, diseases and injuries of.....	723
Blood and blood-forming organs, diseases and injuries of.....	28	Nervous system, diseases and injuries of:	
Bones and cartilages, diseases and injuries of.....	1, 358	Epilepsy without psychosis.....	33
Circulatory system, diseases and injuries of:		Neuritis.....	149
Heart disease, valvular.....	229	All others.....	298
Varicose veins.....	152	Obstetric and gynecological conditions..	13
All others.....	673	Parasitic diseases:	
Communicable and infectious diseases, not including tuberculosis and venereal:		Uncinariasis.....	12
Conjunctivitis, granular trachomatous.....	8	All others.....	92
Dengue.....	2	Poisonings and intoxications:	
Influenza.....	1, 124	Alcohol (ethyl) poisoning, acute.....	219
Malaria.....	281	Alcoholism, chronic (without psychosis).....	60
Rheumatic fever, acute.....	96	All others.....	55
Typhoid fever.....	35	Psychiatric diseases:	
All others.....	274	Drug addiction without psychosis.....	19
Dental.....	166	All others.....	184
Digestive system, diseases and injuries of:		Respiratory system, diseases and injuries of (exclusive of tuberculosis):	
Appendicitis.....	526	Asthma.....	125
Gastritis.....	218	Bronchitis.....	451
Hemorrhoids.....	337	Pleurisy.....	179
All others.....	996	Pneumonia.....	275
Ear, nose, and throat, diseases and injuries of:		All others.....	17
Deviation, nasal septum.....	170	Skin and its appendages, diseases and injuries of.....	587
Otitis media.....	96	Tuberculosis:	
Tonsillitis.....	1, 232	Tuberculosis, pulmonary.....	760
All others.....	492	Tuberculosis (otherwise unclassified).....	47
Endocrines, diseases and injuries of.....	126	Tumors:	
Eye and adnexa, diseases and injuries of.....	318	Carcinoma.....	140
Genito-urinary system, diseases and injuries of (exclusive of venereal):		All others.....	177
Nephritis.....	113	Venereal diseases:	
All others.....	994	Chancroidal infections.....	750
Hernia.....	950	Gonococcus infections.....	2, 359
Joints and bursae, diseases and injuries of:		Syphilis.....	1, 588
Arthritis.....	456	All others.....	32
All others.....	265	Inoculations.....	
Lymphatic system, diseases and injuries of:		Under observation.....	287
Lymphadenitis.....	307	Miscellaneous:	
All others.....	20	Cellulitis.....	187
		All others.....	2, 119
		Total.....	24, 006

DIVISION OF VENEREAL DISEASES

In charge of Asst. Surg. Gen. THOMAS PARRAN, Jr.

The activities of this division, carried out in accordance with the provisions of the law designating its functions, include—

1. Scientific research into the treatment and methods of control of the venereal diseases;

2. Cooperation with State and local health authorities in the development and maintenance of control measures; and

3. Educational work, carried on through conferences and demonstrations, the publication and distribution of literature, the circulation of moving pictures and other exhibit material, and the presentation of lectures, practical talks, and scientific papers to selected groups.

Studies of biologic problems of syphilis and gonorrhea were continued, along with clinical investigations looking to the development of more effective methods of treatment. Further effort to determine more accurately the extent to which the venereal diseases prevail in the United States included the making of additional prevalence surveys in several States and large cities and an intensive study of the syphilis problem in rural negroes of the Southern States. Activities directed toward the reduction of venereal disease incidence among beneficiaries of the Public Health Service, particularly among seamen in the merchant marine and the Coast Guard, were continued and expanded on a more intensive scale. At the close of the year plans were being made to extend the cooperation of the Public Health Service to other industries in an effort to reduce the prevalence of venereal diseases among employees.

SCIENTIFIC RESEARCH

Studies concerning the various aspects of syphilis and gonorrhea continued to occupy a large part of the attention of the division. For a number of years the need for a joint attack upon certain clinical problems in syphilis has been apparent. Such an attack was organized during the year by the collaboration of a group of five of the leading syphilis clinics in the country with the Public Health Service in a retrospective inquiry into the results in the treatment of syphilis. This study was made possible by funds from the Committee on Research in Syphilis in aid of these clinics and is being conducted as a part of a similar international inquiry in cooperation with the League of Nations.

The Committee on Research in Syphilis.—This committee, which was organized in March, 1928, began to function during the past year. The Assistant Surgeon General in charge of the Division of Venereal Diseases was appointed, after departmental approval, as the chairman of its scientific committee. Such an arrangement seemed advantageous both from the standpoint of the Government and this philanthropic organization, whose policy it is to aid with grants of money

the initiation or extension of syphilis research in the leading scientific institutions of this and other countries. The studies now being supported by this committee include efforts to cultivate the *Treponema pallidum* in virulent form, the development of better staining methods for the organism, the comparative pathology of the disease in different races, the conditions under which the body develops a resistance to the disease, studies in experimental chemotherapy, and clinical studies of the effect of treatment.

Cooperative clinical studies.—The League of Nations committee of experts on syphilis, in October, 1928, recommended a study on an international scale of the results of the treatment of syphilis. The Public Health Service was requested to cooperate in this scientific project, which was agreed upon after departmental approval had been secured. In this study the Public Health Service has undertaken to assemble 10,000 case records from various syphilis clinics in the country, to analyze the information available therefrom, and to transmit the case records to the League of Nations for further analysis in comparison with those received from other countries. It is expected that this study will be completed during the next fiscal year.

STUDIES OF SYPHILIS AT THE MARINE HOSPITAL, STAPLETON, N. Y.

For some time consideration has been given to the practicability of utilizing the facilities and material available at relief stations of the Public Health Service in connection with research into the epidemiology and control of the venereal diseases. In the latter part of 1927 this idea was put into practice through the inauguration of a series of special investigations in syphilis at the marine hospital, Stapleton, N. Y. Arrangements were made for the cooperation of the staff of the hospital in carrying out the clinical studies undertaken and a special research laboratory was provided, manned by medical officers specially detailed to carry on the work and other expert scientific personnel.

The first project undertaken included a series of animal experiments in which an effort was made to determine the extent to which the *Treponema pallidum* is present in the lymphatic glands of infected individuals in—

1. Early cases, untreated.
2. Early cases, after treatment with 1 to 12 doses of arsphenamine.
3. Late cases, insufficiently treated.
4. Late cases, not treated.

The results obtained from these studies have been made the subject of two reports which are being prepared for publication. Briefly, they indicate that the treponema is universally present in the lymphatic glands in early untreated cases, while cases which have had one course of arsphenamine, or even less, and old untreated or insufficiently treated cases, will give comparatively few positive results from animal inoculation with the human lymph tissue. Other studies carried on have dealt with the toxicology of the arsenicals and other metallic agents as used in the treatment of syphilis. In addition to these studies it has been planned to take up in the near future investigations into the seminal transmission of syphilis and experimental work in newer methods of transmitting the disease to animals.

STUDIES ON GONORRHEA

The studies on gonorrhea being carried on in cooperation with the John McCormick Institute for Infectious Diseases were continued throughout the fiscal year. The immune serum previously developed was tried out experimentally on a number of cases, and the results which have been obtained up to the present time indicate that the use of an antibody solution, particularly in the treatment of cases of gonorrheal vaginitis, may be expected to yield very good results. A gonococcus toxin for use in the production of acquired immunity also has been developed and is being tried out on a series of cases at the present time.

CLINICAL STUDIES IN COOPERATION WITH THE BUREAU OF MINES

At Picher, Okla., where the Bureau of Mines maintains a general diagnostic clinic in cooperation with the mining companies, the Public Health Service entered into a cooperative project for the clinical study of syphilis, with a view to observing the effect of adequate treatment over a long period of time and endeavoring to establish more satisfactory criteria of cure than are possessed at the present time. By reason of the fact that the patients reside more or less permanently in the community where the treatments are given and are to a certain extent under control the opportunity to study these cases is in several respects an exceptionally favorable one.

CLINICAL STUDIES OF SYPHILIS AT HOT SPRINGS, ARK.

Although the clinic maintained by the Public Health Service in cooperation with the National Park Service and the State Board of Health at Hot Springs, Ark., is operated primarily for the treatment of indigent cases of venereal disease, it has been possible during the past year to utilize the facilities there for research projects in the treatment of syphilis. The first of these dealt with the use of high-temperature baths without other treatment as a therapeutic measure in early syphilis; the second combined high-temperature baths with the medicinal treatment usually administered. The observations made on the series of cases treated by the first method failed to show that the rise in body temperature produced by the baths was of beneficial effect. It is considered possible, however, that had higher body temperatures been produced some curative effect might have been secured, for the results obtained in the second experiment seemed to indicate that the effect of medicinal treatment is enhanced by high body temperature. An additional research project had to do with the use of a new bismuth preparation on cases of syphilis in various stages of the disease.

STUDY OF THE VENEREAL DISEASE PROBLEM AMONG SEAMEN

In February, 1928, a joint study of venereal disease among seamen was undertaken at the port of New York jointly by the Welfare Council of New York City, the American Social Hygiene Association, the New York Tuberculosis and Health Association, and the United States Public Health Service. This study had the following objectives:

a. The determination of the size and character of the problem of venereal disease among seamen as a foundation of a basic method of treatment from the points of view of medical service, social service, and community welfare, and as a foundation for a program of education and prevention for both the seaman and his employer.

b. The solution of the question of treatment, both medical and social, of the seaman on shore—his maintenance while on shore, his employment while taking treatment, his relationships to the various community agencies, and their responsibility for him.

The first phase of this study consisted in the securing of case histories for more than 1,000 venereal disease patients in hospitals of the Public Health Service at the port of New York. The data obtained in these histories have been subjected to analysis and tabulation.

In addition to the case study, an investigation was made of the practice of steamship companies in their employment of men suffering from venereal disease. A compilation and summary of Federal laws, regulations, precedents, and customs directed toward the handling of venereally infected seamen, and international agreements relating to the treatment of venereal diseases also was made. The investigation also included an inquiry into the number of cases of venereal disease admitted to public hospitals in the port of New York, classified by disease and nationality; the number of seamen entering the port of New York, the facilities in New York for treating venereal diseases as related to the various aspects of the seaman's problem, and the number of seamen treated in the city clinics; the social service facilities in New York for handling venereal disease cases among seamen and the question as to what other nations are doing for American seamen in foreign ports.

The report on the results obtained from this investigation is in the course of preparation.

PREVALENCE STUDIES OF VENEREAL DISEASE

The Public Health Service, with the cooperation of the American Social Hygiene Association and State and local public health organizations, continued its efforts to determine more accurately the prevalence of gonorrhea and syphilis in the United States. Taking into account the additional prevalence surveys made during the fiscal year, the population of the communities which had been studied now totals 17,800,000. The results of the surveys in Oregon, Tennessee, Mississippi, St. Louis and its five contingent counties, and Holyoke, Mass., were published during the year.

The prevalence studies now have been carried out in a sufficiently large number and varied types of communities to give a fair sample of what may be expected in the population of the United States as a whole. The whole series of surveys includes 21,841 replies from 20,073 physicians, 828 nonmedical practitioners, and 940 public clinics, hospitals, or other institutions. These physicians and institutions are serving 15 per cent of the population of the United States.

The type of community studied ranged from the large cities, such as Philadelphia, Cleveland, Detroit, and St. Louis, to counties, districts, and States. The prevalence rates given represent the minimum; that is, they take into account only those cases which

had actually sought medical aid and were under authorized care and treatment for their infection on the survey date. Those cases which remained unrecognized or untreated and those which were self-treated or received treatment by irregular practitioners are not included in the rates. With these limitations on the meaning of the figures clearly set forth, the results of all of the studies are presented in the following summary:

The prevalence for both gonorrhea and syphilis per 1,000 population in the surveyed territory was 7.29. The highest rate, 11.73, was found in St. Louis and its surrounding territory. The rate for

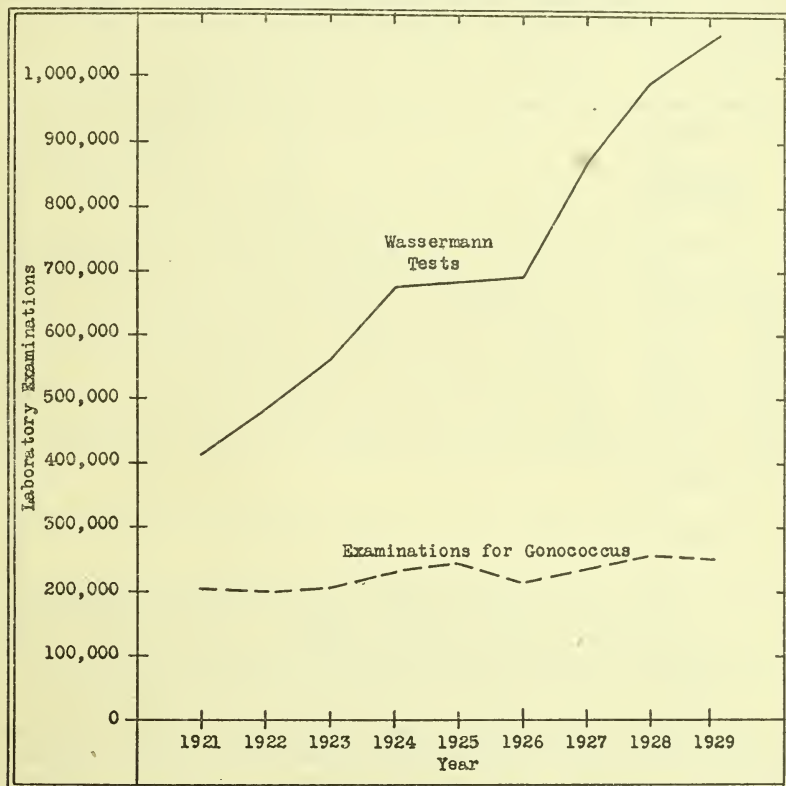


FIGURE 1.—Laboratory examinations reported by State health departments

Cleveland and Detroit was 11 per 1,000. The rate for Philadelphia was 9 per 1,000 population. The prevalence rates for the States partially or completely surveyed were considerably lower than those for the large cities with contiguous counties. Oregon and New York States had a prevalence rate of 5, while the prevalence rates for Tennessee, Virginia, and Mississippi were between 7 and 8 per 1,000 population. Effort has been made to find the reason for the high prevalence rates for the large cities as compared with the rates for counties which include a large amount of rural territory. Whether this difference in the rural and urban territory is as pronounced as the rates would indicate is still undetermined. There is some

evidence that the rural patient seeks his treatment in the city clinic or from the city physician, not so much to secure obscurity for the treatment of his infection as to obtain the treatment of a specialist. One study made to measure the influence of the noncity resident case on the total venereal disease clinic population revealed that in spite of clinic regulations excluding from treatment patients residing outside the city limits, the urban rate was inflated 6 per cent by these cases.

If the prevalence of venereal disease is the same in the country as a whole as it is in the selected communities which have been surveyed, there are approximately 643,000 recognized cases of syphilis and 474,000 cases of gonorrhea constantly under medical care in the United States.

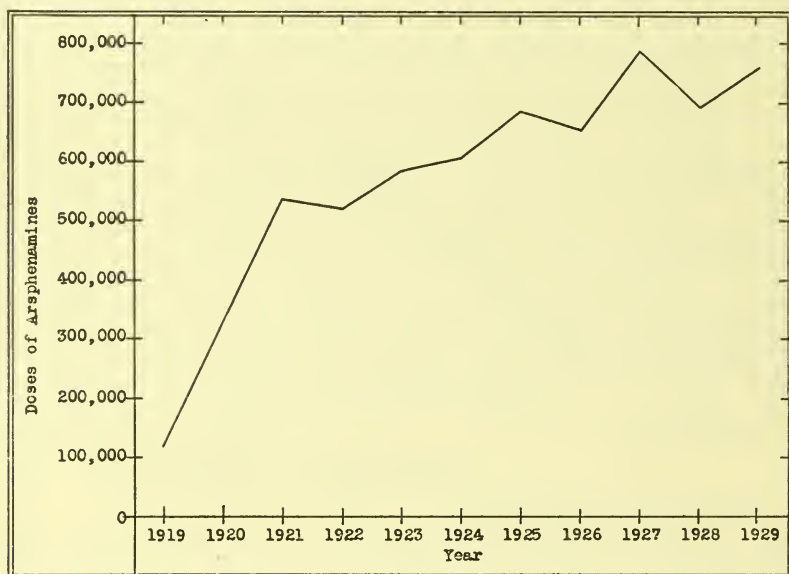


FIGURE 2.—Doses of arsphenamines distributed by State health departments

The prevalence studies have made available considerable information as to the extent and distribution of the venereal infections. Twenty-nine per cent of the cases probably are indigents, since they are being treated at public expense in clinics, hospitals, or other institutions. The remaining 71 per cent are being treated by physicians as private patients. Most of the cases of gonorrhea and syphilis among both sexes are in the hands of the private practitioner—in fact, they are under the care of a comparatively small number of physicians. The results of the surveys reveal that 90 per cent of the private cases are under the care of 25 per cent of the physicians.

Syphilis, particularly in the late stage, contributes a larger percentage of the public clinic venereal disease patients than does gonorrhea. Twenty per cent of the cases of gonorrhea and 36 per cent of the cases of syphilis are treated in the public clinics.

The combined rate for gonorrhea and syphilis for the male population was found to be nearly twice as high as the female rate, being

9.65 and 4.85 per 1,000 population, respectively. This difference was more pronounced for gonorrhea than for syphilis.

Where negroes formed a significant part of the population prevalence data were collected separately for the two races. The combined case rate for these communities was 8 per 1,000 for the white and 11 for the colored. The difference in rates for the two races was especially marked for syphilis, being 4 per 1,000 for the white and 7 for the colored. These findings tend to confirm previously available knowledge concerning the prevalence of syphilis among the negroes as compared with that among white persons.

In certain communities additional information was secured as to the total number of new cases which come to treatment for the first time during a 1-month period. These data by no means represent all the fresh infections which exist in communities. For every case of syphilis and gonorrhea which comes under treatment there is an unknown number of others equally in need of treatment. These additional data were collected in an effort to determine the attack rate of new cases. If the rate for the new cases found for one city with a population of 2,000,000 inhabitants is an index to the new cases reporting for treatment during a 1-month period in the United States as a whole, there are 423,000 new cases of syphilis in its early stage (the first year of the disease), and 679,000 new cases of gonorrhea in its acute stage (the first three months of the infection) treated each year in this country. This annual attack rate per 1,000 population is 3.46 for syphilis and 5.71 for gonorrhea. Since this total incidence of venereal disease is based only on early cases of syphilis and acute cases of gonorrhea, it can be assumed that these represent the minimum number of persons infected annually in the United States.

PREVALENCE OF SYPHILIS AMONG RURAL NEGROES IN MISSISSIPPI

In an effort to secure more accurate data than are now available relative to the prevalence of syphilis among negroes, especially in the rural sections of the Southern States, a field representative of the service was detailed to cooperate with the State Health Department of Mississippi in a prevalence survey made by taking blood Wassermann tests on large groups of negroes of all ages in various localities within the State. At the close of the year more than 7,500 such tests had been made, with the result that dependable information concerning the prevalence of syphilis has been obtained on a group of negroes believed to be fairly representative of the rural colored population of the South. The average percentage of Wassermann positive individuals for all groups so far examined has been approximately 14 per cent. In one instance a group showed 23 per cent positive.

COOPERATIVE ACTIVITIES WITH STATES

Cooperation with the States was continued in the development and maintenance of venereal disease control activities along lines followed in the past. Members of the field staff assisted the State authorities of Florida, New Jersey, Indiana, and New York in the development of educational work. In Tennessee a representative of the service assisted with the organization of the venereal disease control work

in the State health department. Visits were made to a number of normal schools and institutes for the purpose of giving assistance in the carrying out of educational programs for the instruction of prospective teachers and others. A member of the field staff also continued to give instruction at monthly intervals to student officers in training at the county health officers' school maintained jointly in Sunflower County, Miss., by the international health division of the Rockefeller Foundation and the State board of health.

A large majority of the States continued their cooperation with the Public Health Service in making reports of venereal disease control activities. During the fiscal year the States distributed 795,000 bulletins, as compared with 700,000 sent out during the preceding year. There was a slight decrease, however, in the number of lectures, film exhibits, and slide showings reported, as shown by the total of 2,684 as against 3,559 for 1928.

The increase in the utilization of State laboratory services continued, there having been reported a total of 1,073,339 Wassermann or other serological tests for 1929, as against 947,047 for the previous year. There was also an increase in the number of microscopic examinations for the gonococcus. Arsphenamine distributed by State health departments totaled 751,279 doses, as against 674,204 doses for 1928. Further details of the activities of the State health departments for the control of venereal disease are given in Table 3.

NOTIFICATION OF CASES

There were 356,865 cases of venereal diseases reported to State health departments during the fiscal year 1929, this figure giving a case rate of 3.09 per 1,000, as compared with 3.02 for the preceding year. The above total included 195,559 cases of syphilis, 156,544 cases of gonorrhea, and 4,762 cases of chancroid. These figures show an increase in cases reported for all three diseases. Whether they indicate an actual increase in incidence is problematical. It is possible that some of the increase may have been due to a better understanding on the part of the general population concerning the remote dangers of venereal diseases and the necessity for resorting promptly to treatment for new infections. It is also possible that the apparent increase may have been a normal fluctuation. It is not considered likely that it was due to any considerable extent to better reporting. A comparison of cases reported for the fiscal year 1929 with the cases for preceding years is shown in Figure 3.

CLINIC ACTIVITIES

There was a slight decrease in the number of clinics reporting during the fiscal year, the figure having dropped from 451 to 445. New admissions to clinics, however, totaled 120,315, as against 110,756 for the preceding year. There was also a considerable increase in the number of new cases of syphilis and gonorrhea. (See fig. 4.) The number of new admissions to clinics and the total number of treatments given in clinics per 1,000 inhabitants are given for each reporting State in Table 5.

THE PUBLIC HEALTH SERVICE CLINIC AT HOT SPRINGS, ARK.

The venereal disease clinic operated by the Public Health Service in cooperation with the National Park Service and the State Board of Health of Arkansas continued to be used by a large number of indigent

Year	Disease and Number	
1919	7,843	<u>CHANCROID</u>
1920	10,861	
1921	13,226	
1922	8,935	
1923	7,777	
1924	8,484	
1925	6,742	
1926	5,812	
1927	6,990	
1928	4,834	
1929	4,762	
		<u>SYPHILIS</u>
1919	100,466	
1920	142,869	
1921	184,090	
1922	171,824	
1923	172,258	
1924	194,936	
1925	201,692	
1926	205,595	
1927	196,457	
1928	165,437	
1929	195,559	
		<u>GONORRHEA</u>
1919	131,193	
1920	172,387	
1921	189,927	
1922	152,959	
1923	156,826	
1924	161,676	
1925	166,208	
1926	164,808	
1927	160,793	
1928	147,219	
1929	156,544	
Year	Disease and Number	

FIGURE 3.—Cases of venereal diseases reported to State health departments

persons who came from many States. The volume of work continued to increase; a total of 5,265 applicants were admitted for treatment and 75,519 treatments were given, as compared with 5,467 cases admitted and 72,466 treatments given in 1928. A summary of activities is given in Table 2. The clinic continued to be used for the purpose of giving intensive instruction to private physicians recommended

by the several State health departments as students of the management of venereal diseases. The researches conducted at the Hot Springs clinic have been discussed elsewhere in this report.

EDUCATIONAL ACTIVITIES

Educational activities carried on during the year included the distribution of literature; publication and circulation of the monthly bulletin, Venereal Disease Information; the loan of moving pictures and slides; the presentation of papers, lectures, and talks by members of the division staff, and a special campaign among shipping companies looking to the reduction of venereal disease among seamen in the merchant marine. In response to more than 14,000 requests, approximately 580,000 pieces of literature on venereal diseases were

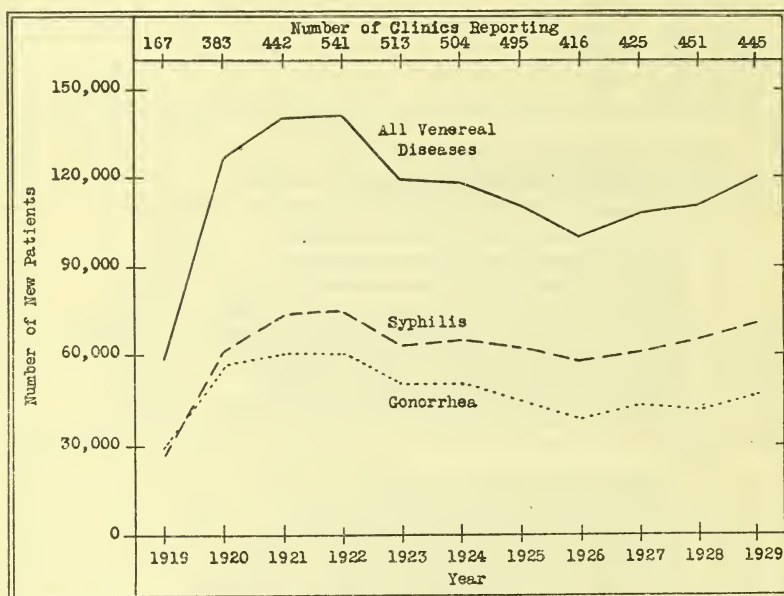


FIGURE 4.—New venereal disease patients admitted to clinics

sent out to individuals, institutions, or organizations; this included 120,000 separate copies of Venereal Disease Information and 60,000 copies of a reprint on The Management of Syphilis in General Practice prepared and published largely for distribution to physicians engaged in general private practice. More than 440,000 of the pamphlets above referred to were sold.

More than 110,000 additional copies of Venereal Disease Information were distributed on subscription, and 76,000 of these were sent to subscribers paying for the bulletin. At the close of the year there were 4,763 paying subscribers and 2,813 on the free list.

Eleven scientific papers and a number of informal addresses were presented by members of the division staff before social hygiene and public health meetings held at various places in the United States in the course of the year.

CAMPAIGN FOR PREVENTION OF VENEREAL DISEASES AMONG SEAMEN

To consider what measures of a practical nature might be put into effect in an attempt to reduce the prevalence of these diseases among seamen in the merchant marine and the United States Coast Guard, a special board was convened in Washington late in the fiscal year

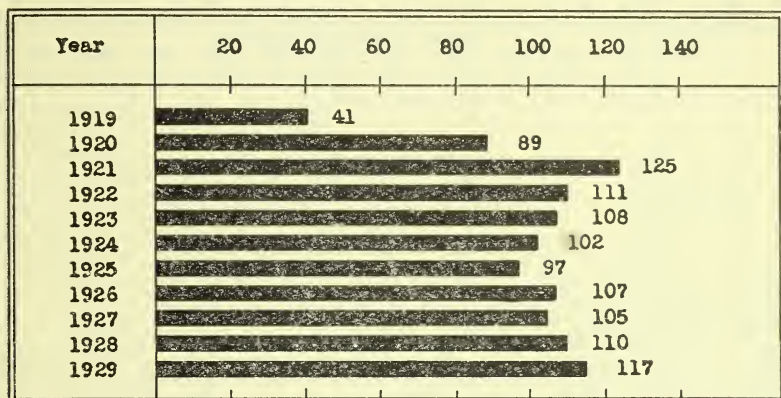


FIGURE 5.—New patients admitted to clinics. Average per clinic

1928. In the meantime, after considerable preliminary work, the medical officer in charge, United States marine hospital, New Orleans, La., initiated, on October 3, 1928, a plan looking to the prevention of venereal diseases on ships calling at that port. Advantage was taken of the fact that in order that vessels entering American ports may

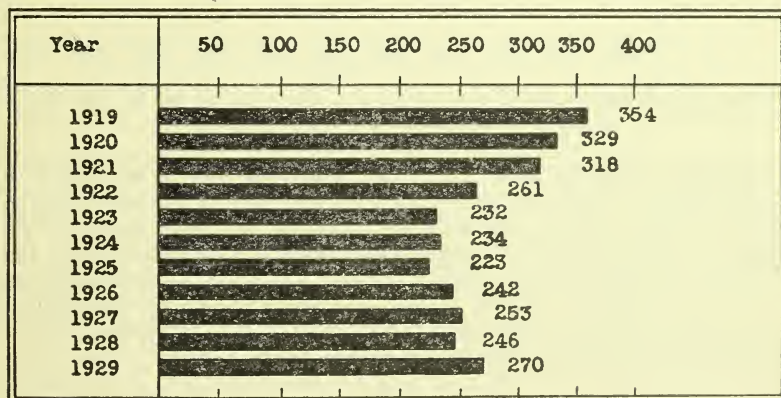


FIGURE 6.—Patients discharged as arrested or cured. Average per clinic

carry medicinal liquor it is necessary for them to have a permit issued by a medical officer of the Public Health Service. Whenever such a permit was issued there was attached to it a letter setting forth the reasons, advantages, and methods of venereal prophylaxis and a blank on which the master of the vessel was requested to make a report when

he next applied for medicinal liquor. He was also given a copy of Venereal Disease Bulletin No. 88, The Prevention of Venereal Diseases, and requested to display it where it would be read by the crew. Four hundred and sixty-three such letters were issued to ships of 18 different nations, the bulk of which were American vessels. Sufficient time has not elapsed to secure reports from all these ships, as many of them touch at New Orleans very infrequently. How-

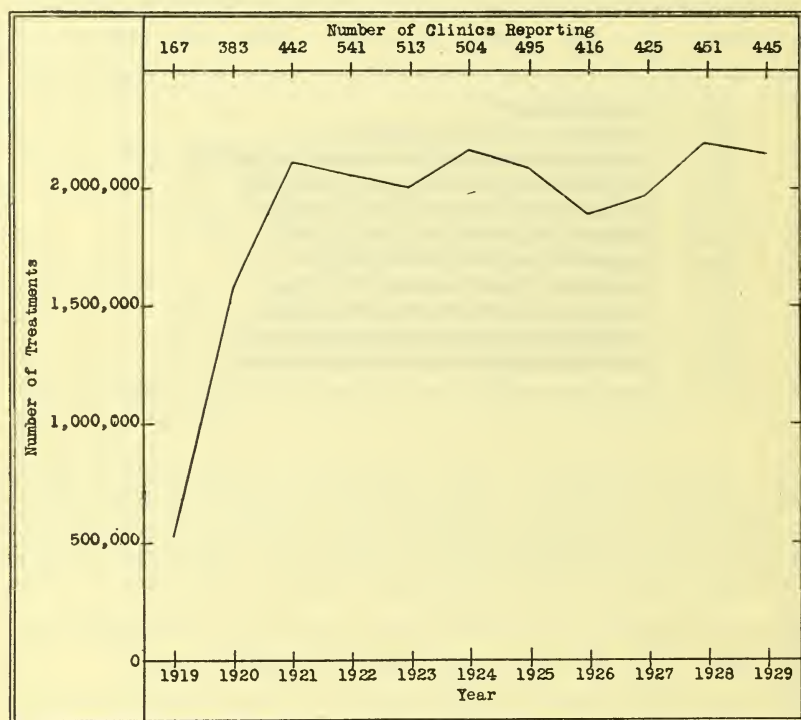


FIGURE 7.—Venereal disease treatments given in clinics

ever, reports received from 89 vessels indicate a very hearty reception of the plan and while the figures given in the reports may not be absolutely accurate, they appear to show that the use of venereal prophylaxis is increasing and is accomplishing results. In 3,073 crew members reported upon, there were 51 cases of venereal disease discovered in 271 inspections and only 12 persons out of the 826 who received venereal prophylaxis were reported as developing venereal disease. The following table sets forth the details of the results:

Letters issued			Reports received					
Nationality	Total ships	Officers and crew	Total ships	Officers and crew	Men given prophylaxis	Crew inspections	Cases of venereal disease	Received prophylaxis
American.....	222	8, 910	68	2, 215	661	215	39	7
British.....	83	3, 762	2	207	3	10	0	0
Norwegian.....	54	1, 463	7	174	4	5	1	0
Honduran.....	19	682	0	0	0	0	0	0
German.....	29	1, 276	10	405	145	35	11	0
Italian.....	9	235	0	0	0	0	0	0
Dutch.....	11	484	2	72	13	6	0	0
Danish.....	10	242	0	0	0	0	0	0
French.....	6	341	0	0	0	0	0	0
Nicaraguan.....	3	85	0	0	0	0	0	0
Japanese.....	6	618	0	0	0	0	0	5
Swedish.....	3	83	0	0	0	0	0	0
Greek.....	2	58	0	0	0	0	0	0
Belgian.....	2	81	0	0	0	0	0	0
Hungarian.....	2	81	0	0	0	0	0	0
Dantzic.....	1	35	0	0	0	0	0	0
Columbian.....	1	37	0	0	0	0	0	0
Cuban.....	1	30	0	0	0	0	0	0
Total.....	464	18, 503	89	3, 073	826	271	51	12

Since the introduction of prophylactic measures on merchant ships appeared, as the result of the trial made possible by the medical officer in charge at New Orleans, it was decided to request the cooperation of the shipping industry generally in a program for the prevention of venereal diseases among seamen. This program included (a) an intensive educational campaign among the seamen aboard ship, in marine hospitals, and in seamen's welfare centers; (b) the provision aboard ship of facilities for chemical prophylactic treatment after exposure; and (c) physical examinations and reexaminations to detect the presence of these diseases. The Public Health Service was to carry out the educational program, including personal talks to seamen, the showing of moving-picture films, the use of placards aboard ships, and the distribution of suitable literature concerning these diseases. The shipping industry was to cooperate by securing the active interest of masters of vessels and ships' officers in keeping their vessels as free from venereal disease as possible and by making available to the seamen facilities for the administration of individual prophylaxis.

The United States Shipping Board promptly agreed to cooperate in the movement and has taken the necessary steps to place prophylactic material and educational posters on all the ships under its supervision. The response on the part of many of the private shipping companies also has been gratifying, and there is good reason to believe that most of them in the near future will lend their active cooperation in the effort to make the operation of the plan a success.

The special board to which reference has been made, as a result of its study of the whole venereal disease problem among seamen, recommended the adoption of a plan calling for periodic talks on venereal diseases and other subjects related to health protection to be given to ambulatory patients at all of the larger marine hospitals. The board also recommended a plan for prevention of venereal diseases in the Coast Guard. This plan included educational measures, the use of chemical prophylaxis, and a more workable policy for the guidance of medical and other officers in handling venereal disease cases among the personnel of Coast Guard units. Some of the measures recommended

already have been put into effect on many of these units, and it is expected that the operation of the plan will be extended throughout the organization in the near future.

TABLE 1.—*Report of the United States Public Health Service clinic at Hot Springs National Park, Ark., from July 1, 1923, to June 30, 1929*¹

Total applicants.....	5, 265
Venereal cases.....	3, 986
Nonvenereal cases.....	1, 279
Syphilis.....	2, 512
New cases.....	1, 858
Readmitted cases.....	654
Gonorrhea.....	1, 474
New cases.....	1, 219
Readmitted cases.....	255
Syphilis (new cases).....	1, 858
Primary.....	236
Secondary.....	124
Tertiary.....	1, 222
Neuro.....	263
Congenital.....	13
Gonorrhea (new cases).....	1, 219
Acute.....	155
Chronic.....	1, 064
Total treatments given.....	178, 307
Syphilis and gonorrhea.....	70, 314
Baths.....	102, 788
Special treatments.....	5, 205
Laboratory examinations.....	46, 623
Wassermanns.....	12, 714
Kolmer quantitative.....	2, 733
Kahn precipitation.....	8, 093
Kahn quantitative.....	1, 238
Icterus indices.....	1, 734
Widals.....	69
Blood counts.....	427
Malaria slides.....	223
Blood cultures.....	44
Blood chemistry (complete).....	60
Blood sugars.....	77
Nonprotein-nitrogen.....	12
Liver function tests.....	12
Urine analysis.....	10, 680
Renal function.....	1, 231
Darkfields.....	405
Smears (gonorrhea).....	4, 154
Sputum.....	45
Feces.....	176
Histopathological diagnosis.....	4
Bacteriological water examination.....	436
Throat cultures.....	50
Autogenous vaccines.....	6
For city health department.....	2, 000

¹ From the annual report submitted by the clinic.

TABLE 2.—*Report of the United States Public Health Service clinic at Hot Springs National Park, Ark., from July 1, 1928, to June 30, 1929*

Year	Number of applicants	Number of cases			Treatments given	Wassermann tests made
		Total venereal diseases	Syphilis	Gonorrhea		
Total.....	32,255	23,463	15,819	7,644	447,744	50,066
1922.....	2,720	1,775	1,182	593	43,830	3,906
1923.....	3,389	1,854	1,326	528	41,559	4,329
1924.....	3,676	2,186	1,447	739	50,683	4,671
1925.....	3,411	2,782	2,011	771	50,608	4,990
1926.....	3,570	3,064	2,211	853	54,590	5,460
1927.....	4,757	3,682	2,504	1,178	58,489	6,275
1928.....	5,467	4,134	2,626	1,508	72,466	7,721
1929.....	5,265	3,986	2,512	1,474	75,519	12,714

TABLE 3.—*Activities of State health departments for the control of venereal diseases, July 1, 1928, to June 30, 1929*

State	Doses of arsphenamines administered	Laboratory examinations			Number of bulletins and pamphlets distributed	Lectures, films, exhibits, and slide showings	
		Wassermann (or other similar) tests	Microscopic examinations for Treponema pallidum	Microscopic examinations for gonococcus		Number	Average attendance
Total.....	751,279	1,073,339	8,469	250,737	795,311	2,684	98
Alabama.....	46,646	63,009	300	2,565	1,044	5	202
Arizona.....	12,973	20,863	541	5,805	5,283	9	122
Arkansas.....	63,331	50,838	265	8,580	29,455	—	—
California.....	2,857	6,153	9	2,058	1,430	—	—
Colorado.....	10,593	46,671	31	3,631	20,265	14	109
Connecticut.....	2,265	2,559	—	747	—	—	—
Delaware.....	5,374	3,037	23	1,279	2,268	14	44
District of Columbia.....	12,307	7,616	—	1,796	3,840	—	—
Florida.....	44,255	50,092	29	1,795	7,057	28	89
Georgia.....	672	8,454	—	1,779	285	—	—
Idaho.....	62,937	69,691	2,794	36,891	68,660	1	60
Illinois.....	26,816	31,735	12	5,225	21,008	40	100
Indiana.....	5,611	2,117	7	2,130	—	—	—
Iowa.....	7,206	23,095	—	3,134	4,398	—	—
Kansas.....	20,201	7,403	381	2,059	17,950	16	74
Kentucky.....	13,456	9,493	165	1,187	2,760	12	104
Louisiana.....	2,309	6,860	31	3,622	4,060	20	100
Maine.....	21,414	5,145	132	4,962	1,550	4	93
Maryland.....	68,200	71,703	—	6,810	35,953	95	67
Massachusetts.....	25,879	34,209	992	25,514	—	—	—
Michigan.....	6,834	44,428	50	8,989	5,037	13	40
Minnesota.....	3,389	34,456	—	1,012	6,311	17	130
Mississippi.....	20,898	15,992	560	3,519	12,700	2	35
Missouri.....	—	—	—	—	—	—	—
Montana ¹	6,020	21,030	88	4,981	146,175	—	—
Nebraska.....	—	2,771	2	1,079	—	—	—
Nevada.....	2,077	4,158	—	1,321	543	—	—
New Hampshire.....	24,014	27,839	277	5,350	30,603	285	98
New Jersey.....	55,700	171,317	61	14,587	92,176	924	98
New Mexico ¹	—	—	—	—	—	—	—
New York.....	165	3,778	4	1,890	32,289	5	90
North Carolina ¹	46,445	31,330	1,064	11,507	—	—	—
North Dakota.....	4,165	756	—	597	—	—	—
Ohio ²	2,334	6,564	50	4,493	1,326	—	—
Oklahoma ³	30,224	50,052	—	13,653	9,811	271	110
Oregon.....	11,297	9,718	49	4,867	17,365	28	137
Pennsylvania.....	6,619	2,187	—	3,296	1,061	—	—
Rhode Island.....	—	4,592	—	—	60	—	—
South Carolina.....	27,888	47,179	321	7,222	3,506	87	53
South Dakota.....	10,384	7,412	—	6,736	6,507	—	—
Tennessee.....	—	—	—	—	—	—	—
Texas.....	1,150	2,683	17	1,262	451	—	—
Utah ¹	8,328	6,300	18	2,616	36,761	192	62
Vermont ⁴	5,446	36,921	109	19,500	210	—	—
Virginia.....	17,505	11,871	3	5,400	79,445	402	139
Washington.....	5,045	9,262	84	5,291	85,703	200	72
West Virginia.....	—	—	—	—	—	—	—
Wisconsin.....	—	—	—	—	—	—	—
Wyoming ¹	—	—	—	—	—	—	—

¹ Not reporting.² From reports of clinics and correctional institutions.³ From clinic reports.⁴ For 10 months.

TABLE 4.—Cases of venereal diseases reported to State health departments and reported venereal disease incidence per 1,000 inhabitants, July 1, 1928, to June 30, 1929

State	Syphilis	Gonorrhea	Chancroid	All venereal diseases	
				Number of cases	Annual rate per 1,000 inhabitants
Total.....	195,559	156,544	4,762	356,865	3.09
Alabama.....	8,647	5,425	350	14,422	5.61
Arizona.....	67	102	9	178	.38
Arkansas.....	2,820	1,601	3	4,424	2.28
California.....	11,829	8,116	43	19,988	4.39
Colorado.....	534	792	13	1,339	1.23
Connecticut.....	2,084	1,740	3	3,827	2.30
Delaware.....	783	281	57	1,121	4.59
District of Columbia.....	719	354	2	1,075	1.95
Florida.....	7,204	1,976	112	9,292	6.59
Georgia.....	6,798	3,586	91	10,475	3.27
Idaho.....	65	108	12	185	.34
Illinois.....	13,041	19,510	558	33,109	4.48
Indiana.....	2,048	1,815	95	3,958	1.25
Iowa.....	893	1,365	16	2,274	.94
Kansas.....	1,498	1,299	10	2,807	1.53
Kentucky.....	3,683	4,070	257	8,010	3.14
Louisiana.....	3,574	1,708	235	5,517	2.83
Maine.....	440	488	9	937	1.18
Maryland.....	1,476	1,534	111	3,121	1.93
Massachusetts.....	1,469	4,272	.....	5,741	1.34
Michigan.....	15,164	9,184	163	24,511	5.34
Minnesota.....	4,261	4,558	40	8,859	3.25
Mississippi.....	16,374	24,641	.....	41,015	22.91
Missouri.....	3,612	2,518	594	6,724	1.91
Montana ².....	.....	.....	.....	.....	.....
Nebraska.....	922	2,173	33	3,128	2.22
Nevada ².....	.....	.....	.....	.....	.....
New Hampshire.....	197	184	2	383	.84
New Jersey.....	5,721	4,296	84	10,101	2.64
New Mexico ².....	.....	.....	.....	.....	.....
New York.....	40,348	14,185	.....	54,533	4.72
North Carolina ².....	.....	.....	.....	.....	.....
North Dakota.....	428	1,328	4	1,760	2.75
Ohio ³	5,962	4,212	386	10,560	1.55
Oklahoma ⁴	707	498	39	1,244	.51
Oregon.....	611	1,448	23	2,082	2.31
Pennsylvania.....	3,314	2,600	167	6,081	.62
Rhode Island.....	477	591	5	1,073	1.50
South Carolina.....	7,872	9,819	60	17,751	9.52
South Dakota.....	68	329	1	398	.57
Tennessee.....	4,929	2,806	369	8,104	3.24
Texas.....	2,607	1,739	536	4,884	.89
Utah ².....	.....	.....	.....	.....	.....
Vermont ⁵	379	362	.....	741	2.52
Virginia.....	1,642	842	4	2,488	.97
Washington.....	1,850	3,124	91	5,065	3.19
West Virginia.....	7,869	2,954	149	10,972	6.36
Wisconsin.....	1,573	2,011	24	2,608	.88
Wyoming ².....	.....	.....	.....	.....	.....

¹ Only those cases of syphilis in an infectious stage are reported.² Not reporting.³ From report of clinics and correctional institutions.⁴ From clinic reports.⁵ For 10 months.

TABLE 5.—*Annual rate per 1,000 inhabitants of new admissions to clinics and of total treatments given in clinics, from July 1, 1928, to June 30, 1929*

State	New admissions	Treatments	State	New admissions	Treatments
Total	1.12	19.76	Montana ²		
Alabama	3.93	51.52	Nebraska	0.68	19.03
Arizona ¹			Nevada ¹		
Arkansas	2.08	94.33	New Hampshire	.42	15.32
California	1.41	24.32	New Jersey	1.18	24.59
Colorado	.66	16.09	New Mexico ²		
Connecticut	.54	13.86	New York	.55	12.54
Delaware	2.25	20.68	North Carolina ²		
District of Columbia	1.89	26.64	North Dakota	.09	.92
Florida	4.11	16.31	Ohio	1.41	24.99
Georgia	1.30	11.98	Oklahoma	.51	7.12
Idaho ¹			Oregon	.53	5.97
Illinois	1.28	22.32	Pennsylvania	.56	3.68
Indiana	.88	27.31	Rhode Island	.97	20.41
Iowa	.39	8.77	South Carolina	1.47	7.76
Kansas	.33	6.02	South Dakota ¹		
Kentucky	3.02	22.96	Tennessee	1.96	40.55
Louisiana	.69	3.59	Texas ¹		
Maine	.56	10.58	Utah ²		
Maryland	1.88	51.38	Vermont ¹		
Massachusetts	1.31	42.59	Virginia	.75	5.23
Michigan	1.51	29.90	Washington	.81	14.00
Minnesota	.35	9.11	West Virginia	1.20	17.54
Mississippi	.02	.15	Wisconsin	.58	9.49
Missouri	.67	18.90	Wyoming ²		

¹ No clinics.² Not reporting.TABLE 6.—*Report of cooperative clinics furnished through State health departments, from July 1, 1928, to June 30, 1929*

[Numbers in parentheses indicate the number of clinics included in the tabulation for the city]

State and city	Total monthly reports received	New cases admitted				Cases discharged as arrested or cured	Treatments given	Doses of arsenphenamines administered	Wassermann tests made	Microscopic examinations for gonococcus
		Total	Syphilis	Gonorrhea	Chancroid					
Total	4,970	120,315	71,291	48,428	2,596	52,136	12,128,417	594,545	367,075	170,893
Alabama	168	10,110	6,831	3,033	241	5,237	132,566	45,493	12,131	2,565
Anniston	12	159	138	21		121	2,418	1,127	481	43
Birmingham (2)	21	2,595	1,930	661	4	1,850	42,447	15,365	320	36
Decatur	12	145	125	20	1	95	3,394	2,075	4,206	801
Florence	12	123	44	77	2	105	5,679	885		
Gadsden	12	133	57	71	5	128	3,401	411	124	84
Huntsville	12	143	102	41		53	1,143	742	231	110
Mobile	12	1,742	1,187	518	37	479	23,587	7,362	1,306	148
Montgomery	12	924	574	280	70	523	7,464	2,504	473	
Ridderwood	4	24	21	3		6	251	234	40	
Selma	12	125	124			47	1,856	552	250	
Talladega	12	126	82	40	4	1	2,098	800	286	69
Tuscaloosa	12	369	262	103	4	300	5,525	1,152	451	251
Tusculum	11	79	58	20	1	44	1,529	551	45	7
Cooperative clinics	12	3,422	2,127	1,177	118	1,485	31,774	11,683	3,923	1,013
Arkansas	79	4,050	2,586	1,462	2	4,033	183,368	12,286	18,008	5,261
Fort Smith	11	63	60	3		32	907	514	176	20
Hot Springs (2)	24	3,155	1,936	1,219		3,909	174,832	8,992	12,833	4,108
Little Rock	12	700	549	151		51	7,341	2,626	4,593	772
North Little Rock	10	4	3	1			38	24	42	11
Pine Bluff	12	12	12			2	66	50	144	
Texarkana	10	116	26	88	2	39	184	80	220	350

¹ Includes 102,788 baths given patients at U. S. Public Health Service clinic at Hot Springs National Park, Ark.

TABLE 6.—*Report of cooperative clinics furnished through State health departments, from July 1, 1923, to June 30, 1929—Continued*

State and city	Total monthly reports received	New cases admitted				Cases discharged or arrested or cured	Treatments given	Doses of arsenphenamines administered	Wassermann tests made	Microscopic examinations for gonococcus
		Total	Syphilis	Gonorrhea	Chancroid					
California.....	168	6,429	4,050	2,334	45	1,621	110,800	33,474	22,308	6,583
El Monte.....	11	12	12	-----	-----	3	689	467	97	-----
Fresno.....	12	177	108	69	-----	26	1,843	514	211	26
Los Angeles (3).....	48	2,870	1,845	1,008	17	634	50,596	17,635	5,633	1,623
Oakland.....	12	723	445	278	-----	137	10,950	3,455	3,556	277
San Diego.....	12	403	245	156	2	447	5,651	1,723	1,290	400
San Francisco (4).....	49	1,639	1,128	490	21	218	33,706	8,019	10,184	3,313
San Jose.....	12	66	46	15	5	-----	530	214	475	16
Stockton.....	12	539	221	318	-----	156	6,835	1,447	862	928
Colorado.....	60	724	282	432	10	639	17,439	2,857	1,354	1,161
Colorado Springs.....	12	23	17	6	-----	11	514	183	59	48
Denver (2).....	24	552	231	320	1	528	13,089	2,106	1,083	838
Fort Collins.....	12	85	5	78	2	81	2,443	179	41	238
Pueblo.....	12	64	29	28	7	19	1,393	389	171	37
Connecticut.....	84	896	420	465	11	418	23,103	6,154	1,535	1,275
Bridgeport.....	12	75	49	24	2	45	4,644	1,153	357	82
Hartford.....	12	337	119	211	7	190	7,001	2,038	369	717
New Haven.....	12	170	100	70	-----	44	7,556	1,375	442	182
New London.....	12	28	28	-----	-----	22	955	276	115	-----
Norwich.....	12	21	19	2	-----	1	388	361	45	8
Stamford.....	12	227	81	144	2	110	1,550	525	143	270
Waterbury.....	12	38	24	14	-----	6	1,009	426	64	16
Delaware.....	36	549	346	145	58	247	5,045	2,225	314	41
Dover.....	12	200	52	99	49	146	2,039	678	-----	-----
Wilmington (2).....	24	349	294	46	9	101	3,006	1,547	314	41
District of Columbia: Washington.....	12	1,046	719	324	3	13	14,703	5,373	3,020	1,279
Florida.....	35	5,806	4,227	1,491	88	1,744	23,014	12,207	7,616	1,796
Jacksonville.....	12	1,279	1,161	99	19	256	12,403	6,782	2,360	29
Miami.....	11	668	436	163	69	83	8,221	3,150	1,701	576
Tampa.....	12	3,859	2,630	1,229	-----	1,405	2,390	2,275	3,555	1,191
Georgia.....	78	4,159	3,014	1,111	34	1,858	38,371	19,396	15,473	321
Atlanta (2).....	23	1,857	974	883	-----	-----	13,312	6,424	7,646	4
Augusta.....	12	213	111	92	10	184	10,837	2,140	2,734	248
Brunswick.....	12	171	171	-----	-----	72	1,277	649	828	-----
Columbus.....	12	205	148	52	5	3	1,826	844	3	1
Macon.....	7	403	327	60	16	68	2,650	1,689	1,115	41
Savannah.....	12	1,310	1,283	24	3	1,531	8,469	7,650	3,147	27
Illinois.....	259	9,464	5,012	4,080	372	5,709	165,101	57,876	48,102	20,844
Alton.....	12	178	123	54	1	156	6,600	693	240	225
Cairo.....	12	155	125	30	-----	84	2,365	1,034	257	17
Calumet City.....	12	10	6	4	-----	-----	2,581	624	17	-----
Chicago (11).....	130	7,878	4,057	3,483	338	4,619	125,773	49,066	45,435	18,877
Decatur.....	12	201	122	79	-----	95	4,664	1,758	303	454
East St. Louis.....	12	307	156	121	30	251	6,428	593	250	433
Evanston.....	12	126	77	48	1	40	2,076	805	300	56
La Salle.....	12	7	-----	6	1	10	223	15	3	10
Litchfield.....	9	24	2	22	-----	16	1,160	95	15	166
Peoria.....	12	242	164	77	1	115	5,098	1,854	485	151
Rockford.....	12	108	48	60	-----	68	2,584	798	196	134
Springfield.....	12	228	132	96	-----	255	5,549	541	601	321
Indiana.....	191	2,780	1,410	1,284	86	1,426	86,734	25,193	6,695	2,167
Anderson.....	12	213	78	135	-----	161	6,856	60	242	247
Columbus.....	12	16	5	11	-----	13	926	135	20	16
Elwood.....	12	41	19	22	-----	58	1,064	7	30	20
Evansville.....	12	685	316	363	6	169	18,343	4,883	1,365	451
Fort Wayne.....	12	158	71	84	3	73	2,029	451	162	175
Hammond.....	12	161	109	42	10	83	5,005	1,242	441	21

TABLE 6.—*Report of cooperative clinics furnished through State health departments, from July 1, 1928, to June 30, 1929—Continued*

State and city	Total monthly reports received	New cases admitted				Cases discharged as arrested or cured	Treatments given	Doses of arsenphenamines administered	Wassermann tests made	Microscopic examinations for gonococcus
		Total	Syphilis	Gonorrhea	Chancroid					
Indiana—Continued.										
Indianapolis.....	24	304	135	144	25	282	19,358	4,982	1,839	385
Kokomo.....	12	96	72	24	—	2	2,697	1,091	122	32
La Fayette.....	1	12	9	3	—	5	484	228	53	19
Madison.....	12	53	17	30	6	62	1,281	186	21	26
Marion.....	11	114	45	66	3	109	2,858	500	45	—
Muncie.....	12	278	119	126	33	209	7,061	4,046	150	106
New Castle.....	12	48	19	29	—	28	721	198	55	7
Richmond.....	12	42	36	6	—	12	2,356	851	183	35
South Bend.....	11	158	121	37	—	97	5,444	2,730	539	287
Terre Haute.....	12	401	239	162	—	63	10,251	3,603	1,428	340
Iowa.....	102	953	566	376	11	422	21,283	5,681	2,175	2,535
Belle Plaine.....	8	28	7	17	4	45	725	206	29	121
Burlington.....	12	37	23	14	—	24	477	67	37	32
Cedar Rapids.....	12	67	63	4	—	14	2,539	1,208	104	22
Clinton.....	8	57	25	27	5	51	472	185	77	51
Davenport.....	11	59	55	4	—	25	1,632	740	323	9
Des Moines.....	12	575	315	260	—	147	13,083	2,710	1,465	2,232
Dubuque.....	11	28	11	17	—	25	524	67	27	25
Keokuk.....	4	7	2	5	—	5	65	10	2	14
Ottumwa.....	12	40	30	10	—	39	654	320	54	5
Waterloo.....	12	55	35	18	2	47	1,112	168	57	24
Kansas.....	38	597	357	232	8	187	11,038	4,040	1,319	888
Kansas City.....	9	145	74	67	4	51	1,352	540	110	87
Topeka.....	12	163	89	70	4	13	3,339	1,251	564	384
Wichita (2).....	17	289	194	95	—	123	6,347	2,249	645	417
Kentucky.....	217	7,701	3,550	3,900	251	3,041	58,617	19,882	7,187	2,081
Ashland.....	12	185	120	65	—	—	3,558	1,595	245	348
Booneville.....	4	7	7	—	—	4	72	36	23	1
Clinton.....	9	2	2	—	—	5	22	20	7	2
Covington.....	12	229	96	132	1	226	1,897	451	248	222
Frankfort.....	12	922	432	490	—	1,149	3,081	894	1,001	70
Fulton and Hickman.....	12	38	32	5	1	4	372	369	67	4
Georgetown.....	12	46	25	17	4	35	443	205	87	12
Hazard.....	9	305	222	83	—	167	3,035	1,435	443	160
Henderson.....	11	45	28	16	1	21	699	243	138	160
Inez.....	2	2	1	1	—	1	15	12	2	—
Lexington.....	11	865	513	253	99	535	12,239	3,134	1,672	538
Louisville (2).....	14	4,160	1,419	2,601	140	716	25,084	6,999	1,584	207
Middleboro.....	2	12	12	—	—	—	70	70	29	—
Neon and Whitesburg.....	9	93	83	10	—	30	614	394	143	24
Newport.....	10	112	56	53	3	33	1,433	280	171	114
Owensboro.....	12	87	68	18	1	13	529	337	181	45
Paducah.....	12	81	72	9	—	12	1,658	865	196	3
Pikesville.....	7	176	103	72	1	61	1,084	489	192	84
Pineville.....	12	124	124	—	—	1	1,031	951	376	—
Prestonburg.....	11	97	66	31	—	2	914	674	220	28
Salversville.....	1	8	4	4	—	—	16	7	4	—
West Liberty.....	10	4	3	1	—	—	33	22	15	1
Cooperative clinicians.....	11	101	62	39	—	26	718	400	143	58
Louisiana.....	21	1,341	1,017	316	8	10	7,006	6,097	1,634	381
New Orleans.....	12	706	524	182	—	10	4,619	3,725	1,019	379
Shreveport.....	9	635	493	134	8	—	2,387	2,372	615	2
Maine.....	53	449	218	215	16	300	8,412	2,309	731	621
Bangor.....	5	76	11	64	1	—	718	218	46	63
Bath.....	12	15	12	3	—	3	1,432	144	91	412
Calais.....	12	46	16	30	—	90	1,263	531	85	22
Portland (2).....	24	312	179	118	15	207	4,999	1,416	509	124

TABLE 6.—*Report of cooperative clinics furnished through State health departments, from July 1, 1928, to June 30, 1929—Continued*

State and city	Total monthly reports received	New cases admitted				Cases discharged as arrested or cured	Treatments given	Doses of arsenphenamines administered	Wassermann tests made	Microscopic examinations for gonococcus
		Total	Syphilis	Gonorrhea	Chancroid					
Maryland.....	211	3,039	1,463	1,465	111	1,185	83,022	21,307	5,022	4,414
Annapolis.....	12	139	66	73	---	71	1,674	501	213	---
Baltimore.....	48	1,811	906	811	94	590	54,709	13,549	3,165	2,176
Bel Air.....	12	25	24	1	---	---	333	268	59	---
Cambridge.....	9	14	3	11	---	---	136	51	4	1
Crisfield.....	11	99	31	65	3	89	1,060	312	55	161
Cumberland.....	12	313	84	227	2	146	16,311	2,278	533	814
Easton.....	12	72	43	25	4	53	1,444	1,197	185	39
Ellicott City.....	12	35	30	5	---	13	640	342	124	24
Frederick.....	12	142	43	99	---	63	1,924	313	110	263
Hagerstown.....	21	146	76	70	---	70	1,934	1,110	327	756
Havre de Grace.....	12	36	35	1	---	10	345	305	48	5
Hughesville.....	8	32	6	23	3	16	271	66	15	---
Rockville.....	8	23	26	---	---	10	318	105	74	9
Salisbury.....	10	72	54	18	---	12	394	283	50	26
Westminster.....	12	77	36	36	5	42	1,529	627	60	140
Massachusetts.....	408	5,637	2,988	2,649	---	2,564	182,719	50,294	24,729	21,440
Boston (8).....	102	3,629	1,821	1,808	---	1,250	119,673	35,139	15,656	15,864
Brockton.....	12	72	54	18	---	57	3,273	1,575	477	108
Cambridge (2).....	24	43	37	6	---	8	407	182	107	7
Concord Junction.....	12	95	12	83	---	142	1,368	109	608	---
Fall River (2).....	24	127	51	76	---	64	6,193	877	288	671
Fitchburg.....	12	56	48	8	---	7	425	308	45	8
Foxboro.....	12	20	17	3	---	4	295	2	468	6
Haverhill.....	12	49	17	32	---	40	1,725	314	71	104
Holyoke.....	12	59	33	26	---	23	2,506	795	215	72
Lawrence.....	12	74	39	35	---	23	2,170	652	208	70
Lowell.....	12	157	48	109	---	148	4,785	1,347	742	1,342
Lynn.....	12	223	125	98	---	249	3,121	670	252	353
New Bedford.....	12	228	142	86	---	100	6,436	1,618	335	131
Pittsfield.....	12	36	25	11	---	29	773	302	35	16
Pocasset.....	12	4	4	---	---	1	43	43	28	1
Quincy.....	12	7	3	4	---	3	245	70	7	1
Rutland.....	12	7	7	---	---	5	3	3	332	---
Salem.....	6	5	5	---	---	11	129	36	34	22
Springfield.....	12	121	80	41	---	83	5,395	1,983	453	22
Taunton.....	12	44	44	---	---	23	1,259	362	530	---
Tewksbury.....	12	296	169	127	---	153	13,548	894	1,170	1,900
Westboro.....	12	22	21	1	---	6	723	476	393	183
Worcester (3).....	36	263	186	77	---	135	8,224	2,537	2,275	559
Michigan.....	166	6,933	3,808	3,054	71	3,078	137,290	25,199	31,199	25,203
Battle Creek.....	12	65	41	24	---	47	605	249	144	71
Detroit (4).....	48	5,705	3,117	2,535	53	2,646	113,132	19,566	26,071	21,655
Flint.....	12	232	102	125	5	43	9,374	2,054	1,019	1,660
Grand Rapids.....	12	120	71	49	---	25	2,475	500	147	116
Highland Park.....	11	15	15	---	---	22	1,193	421	72	---
Jackson.....	12	83	61	21	1	89	1,657	613	654	73
Kalamazoo.....	12	51	26	24	1	---	289	178	114	115
Lansing.....	12	61	42	19	---	58	425	137	145	78
Pontiac (2).....	24	568	302	256	10	112	7,059	1,164	2,646	1,375
Saginaw.....	11	33	31	1	1	36	1,081	317	187	60
Minnesota.....	48	961	469	489	3	252	24,795	5,728	2,595	1,079
Duluth.....	12	444	202	242	---	110	9,958	1,579	610	601
Minneapolis (2).....	24	280	156	123	1	63	8,787	2,141	982	114
St. Paul.....	12	237	111	124	2	79	6,050	2,008	1,003	364
Mississippi: Meridian.....	2	39	31	8	---	117	271	155	24	18
Missouri.....	102	2,347	1,612	722	13	775	66,576	10,679	7,687	2,300
Flat River.....	12	39	34	5	---	5	445	379	186	21
Hannibal.....	12	51	22	28	1	24	338	222	79	39
Kansas City (3).....	26	1,057	623	426	8	135	25,857	5,786	2,254	1,498
Springfield.....	12	158	80	74	4	101	2,393	789	337	216
St. Joseph.....	11	291	148	143	---	154	3,036	1,306	415	149
St. Louis (4).....	29	751	705	46	---	356	34,507	2,197	4,416	377

TABLE 6.—*Report of cooperative clinics furnished through State health departments, from July 1, 1928, to June 30, 1929—Continued*

State and city	Total monthly reports received	New cases admitted				Cases discharged as arrested or cured	Treatments given	Doses of arsenphen- amines admin- istered	Wasser mann tests made	Microscopic examinations for gonococcus
		Total	Syphilis	Gonorrhea	Chancroid					
Nebraska	57	953	414	536	3	256	26,789	5,768	4,014	3,673
Hastings	12	14	1	13		18	1,189	37	8	200
Lincoln	12	223	102	119	2	137	12,568	2,314	1,549	2,657
Omaha (2)	24	640	259	380	1	79	12,214	3,005	2,272	790
Winnebago	9	76	52	24		22	818	412	185	26
New Hampshire	47	191	148	43		22	6,984	1,998	553	204
Concord	12	104	92	12		11	491	201	101	20
Dover	11	11	9	2		8	335	85	15	2
Manchester	12	64	39	25		1	5,062	1,422	145	168
Nashua	12	12	8	4		2	1,096	290	292	14
New Jersey	287	4,518	2,701	1,792	25	1,087	93,975	23,680	14,210	3,843
Atlantic City	12	419	222	197			5,902	1,534	728	67
Bayonne	12	35	34		1	4	406	209	202	6
Camden	12	98	79	18	1	2	1,682	653	61	8
Elizabeth	12	293	176	117		160	6,449	2,296	807	414
Englewood	12	73	60	12	1	23	1,304	214	455	182
Greystone Park	12	85	45	40		89	2,201	1,319	79	73
Hackensack	12	59	46	13		37	1,048	482	106	18
Jersey City	11	98	47	48	3	43	4,656	1,718	479	367
Long Branch	12	83	81	2		20	1,815	374	368	149
Montclair	12	70	65	5		18	2,168	1,238	674	13
Morristown	12	39	26	13		25	654	458	174	32
Mount Holly	12	28	28			12	211	119	482	27
Newark	12	2,019	1,082	927	10	274	36,489	7,247	5,100	1,991
New Brunswick	12	107	58	49		54	1,937	927	187	76
Orange	12	224	150	74		85	5,149	1,536	1,933	10
Passaic	12	33	20	13			1,052	323	127	2
Paterson (2)	24	193	95	96	2	89	5,485	1,065	1,104	106
Plainfield	12	98	68	26	4	62	2,082	417	174	26
Salem	12	41	33	8		6	956	175	82	6
Somerville	12	20	18	2		1	197	102	28	
Spring Lake	12	36	36			4	690	325	113	
Trenton	12	346	223	121	2	72	10,784	859	698	251
Weehawken	12	21	9	11	1	7	658	90	49	19
New York	557	6,332	4,318	1,970	44	3,850	144,804	41,290	13,416	6,086
Albany (4)	46	301	176	124	1	173	9,666	1,915	547	111
Amsterdam	12	20	13	7		11	1,458	721	54	2
Auburn	12	13	12	1		2	623	162	72	8
Beacon	12	6	6			8	268	118	131	1
Binghamton	12	116	115	1		158	5,868	1,982	556	29
Buffalo (2)	36	2,740	2,071	651	18	1,482	31,590	4,794	3,472	3,369
Cohoes	12	25	7	15	3	36	398	189	29	2
Corning	11	28	17	10	1	24	463	308	47	18
Courtland	1	39	28	9	2	7	88	50	18	10
Dunkirk	12	7	7			1	302	164	26	5
Elmira	12	100	62	38		76	2,691	952	168	32
Endicott	1	5	4		1		64	32	2	5
Glen Falls	12	45	26	19			2,273	1,094	144	58
Gloversville	12	27	20	7		18	1,080	529	56	25
Hornell	12	25	17	8		44	360	84	40	13
Hudson	3						1	1	2	1
Ithaca	12	18	15	3		7	261	127	13	2
Jamestown	12	57	39	18		40	2,332	1,045	256	52
Little Falls	10	17	12	5		7	139	87	10	4
Mineola	2	9	9				34	34	11	1
Newburgh	12	32	30	2		13	695	186	24	1
New Rochelle	12	253	158	91	4	247	5,009	877	405	267
Niagara Falls	12	107	67	40		105	3,576	1,284	264	74
Olean	12	23	19	4		20	423	94	35	1
Oswego	12	17	7	9	1	27	1,216	815	68	44
Plattsburgh	12	12	10	2		1	304	115	27	3
Port Chester	11	53	47	4	2	111	1,856	775	125	31
Poughkeepsie	12	49	36	13		39	1,407	529	118	55
Rochester (7)	75	719	550	169		479	31,874	13,846	3,494	412
Rome	12	63	36	27		30	1,301	536	121	42
Salamanca	10	20	14	5	1	20	306	128	63	1
Saratoga Springs	12	37	28	9		13	477	197	22	2
Schenectady (2)	15	126	63	63		33	1,959	279	82	46

TABLE 6.—*Report of cooperative clinics furnished through State health departments, from July 1, 1928, to June 30, 1929—Continued*

State and city	Total monthly reports received	New cases admitted				Cases discharged as arrested or cured	Treatments given	Doses of arsenamines administered	Wassermann tests made	Microscopic examinations for gonococcus
		Total	Syphilis	Gonorrhea	Chancroid					
New York—Continued.										
Syracuse.....	12	721	277	434	10	243	15,074	1,603	1,480	695
Troy.....	12	68	34	34	-----	50	2,942	1,204	200	75
Utica.....	12	134	92	42	-----	86	6,227	1,555	597	90
Watertown.....	12	63	56	7	-----	21	1,983	978	138	16
Wellsville.....	12	15	11	4	-----	7	389	131	9	-----
White Plains.....	12	56	50	6	-----	46	420	263	49	5
Yonkers.....	12	166	77	89	-----	165	7,407	1,507	441	478
North Dakota.....	11	57	32	25	-----	13	592	214	62	169
Grand Forks.....	2	9	3	2	-----	1	66	12	6	18
Minot.....	9	48	29	23	-----	12	526	202	56	151
Ohio.....	388	9,651	5,371	3,895	385	2,814	170,574	43,782	27,491	10,675
Akron.....	12	734	303	402	29	138	12,153	3,096	1,632	1,120
Canton.....	12	68	61	7	-----	4	1,087	351	226	13
Chillicothe.....	12	6	6	-----	-----	2	50	50	3	-----
Cincinnati (2).....	23	1,551	1,106	404	41	5	21,327	5,173	4,270	75
Cleveland (10).....	130	4,122	1,947	1,886	289	1,578	90,961	19,125	13,093	6,819
Columbus (3).....	35	1,033	600	414	19	594	12,590	2,715	3,959	1,620
Dayton (2).....	24	590	483	107	-----	69	8,754	3,936	1,041	59
East Liverpool.....	12	69	41	27	1	37	1,749	504	112	159
Hamilton.....	11	52	52	-----	-----	56	468	283	159	10
Lakewood.....	12	8	6	2	-----	1	123	20	24	29
Lima.....	12	15	11	4	-----	-----	812	312	32	5
Portsmouth.....	11	101	101	-----	-----	85	1,378	1,024	215	-----
Port Clinton.....	12	8	6	2	-----	-----	73	41	80	2
Springfield (2).....	24	270	206	62	2	154	3,621	1,481	706	252
Toledo (2).....	23	813	289	521	3	19	11,193	4,028	883	458
Youngstown (2).....	23	211	153	57	1	72	4,235	1,643	1,056	54
Oklahoma: Oklahoma City.....	12	1,244	707	498	39	518	17,281	4,165	756	597
Oregon: Portland.....	12	479	298	181	-----	169	5,387	1,862	733	627
Pennsylvania.....	493	5,547	3,141	2,249	157	3,282	36,274	28,754	11,706	-----
Allentown.....	12	252	164	87	1	32	1,166	335	982	-----
Altoona.....	12	120	79	41	-----	99	2,321	1,245	190	-----
Beaver Falls.....	12	116	66	50	-----	96	1,013	827	146	-----
Bedford.....	10	29	13	16	-----	22	244	244	79	-----
Bethlehem.....	11	143	116	27	-----	59	1,286	1,093	224	-----
Butler.....	12	40	29	10	1	36	432	432	118	-----
Carlisle.....	12	9	8	1	-----	-----	257	228	61	-----
Chambersburg.....	12	130	70	60	-----	20	424	424	140	-----
Clearfield.....	3	13	13	-----	-----	-----	280	214	28	-----
Coatesville.....	12	62	50	12	-----	22	361	255	97	-----
Connellsville.....	12	95	62	33	-----	-----	572	454	179	-----
Du Bois.....	12	96	49	46	1	86	896	689	213	-----
Easton.....	12	69	54	13	2	8	457	426	147	-----
Erie.....	12	243	145	98	-----	141	1,759	1,728	987	-----
Hazleton.....	12	35	20	15	-----	19	329	106	131	-----
Huntington.....	11	38	21	13	4	7	198	165	46	-----
Johnstown.....	12	317	196	113	8	229	1,544	1,543	498	-----
Lancaster (2).....	23	99	75	24	-----	9	976	698	221	-----
Lebanon.....	12	20	13	7	-----	5	107	78	33	-----
Lewistown.....	12	53	20	30	3	50	260	255	86	-----
Lock Haven.....	9	17	17	-----	-----	-----	-----	-----	40	-----
McKeesport.....	12	157	81	65	11	99	1,263	795	434	-----
Meadville.....	11	37	32	5	-----	-----	186	178	54	-----
Mifflintown.....	4	12	3	9	-----	5	14	12	3	-----
New Castle.....	12	83	64	19	-----	22	257	237	96	-----
Norristown.....	12	40	35	5	-----	1	560	466	176	-----
Philadelphia.....	4	41	3	38	-----	11	26	13	11	-----
Pittsburgh.....	12	778	427	344	7	633	4,502	3,798	819	-----
Reading.....	12	466	187	270	9	320	-----	-----	-----	-----
Rochester.....	12	29	29	-----	-----	19	407	407	78	-----
Scranton (2).....	20	423	151	205	67	384	4,041	1,977	1,593	-----
Shamokin.....	12	117	69	38	10	41	940	890	408	-----
Sharon.....	12	52	42	10	-----	-----	339	336	47	-----
Stroudsburg.....	12	50	16	32	2	19	96	94	47	-----
Sunbury.....	12	101	54	47	-----	65	551	531	115	-----
Tunkhannock.....	10	10	2	8	-----	-----	9	9	8	-----
Uniontown.....	3	49	49	-----	-----	6	285	258	22	-----
Washington.....	12	146	87	57	2	131	1,253	1,088	140	-----

TABLE 6.—*Report of cooperative clinics furnished through State health departments, from July 1, 1928, to June 30, 1929—Continued*

State and city	Total monthly reports received	New cases admitted				Cases discharged as arrested or cured	Treatments given	Doses of arsenphen- amines admin- istered	Wassermann tests made	Microscopic examinations for gonococcus
		Total	Syphilis	Gonorrhea	Chancroid					
Pennsylvania—Con.										
West Chester.....	12	102	72	30	-----	-----	235	202	243	-----
West Grove.....	7	8	8	-----	-----	-----	52	52	5	-----
Wilkes-Barre (2).....	23	564	225	311	28	560	5,009	4,731	2,478	-----
Williamsport.....	8	55	42	13	-----	-----	661	597	78	-----
York.....	12	231	183	47	1	26	706	644	205	-----
Rhode Island.....	72	697	391	305	1	445	14,611	5,216	8,161	4,867
Newport.....	12	18	15	3	-----	31	464	192	40	1
Pawtucket.....	12	78	61	17	-----	28	3,149	835	298	76
Providence (3).....	36	569	297	271	1	347	10,565	4,148	7,752	4,787
Woonsocket.....	12	32	18	14	-----	39	433	41	71	3
South Carolina.....	34	2,731	1,531	1,113	87	827	14,463	6,509	1,990	3,432
Columbia.....	12	399	234	110	55	92	2,344	963	485	224
Orangeburg.....	11	777	483	294	-----	160	2,525	1,842	478	-----
Spartanburg.....	11	1,555	814	709	32	575	9,650	3,704	1,027	3,208
Tennessee.....	121	4,916	2,918	1,641	357	2,165	101,448	27,490	23,959	4,773
Cleveland.....	5	35	22	13	-----	26	748	383	86	11
Dyersburg.....	10	91	68	19	4	28	1,526	774	141	65
Franklin.....	8	25	11	13	1	10	163	78	63	21
Knoxville.....	11	1,126	526	585	15	330	26,748	6,342	1,887	1,761
Maryville.....	12	13	12	1	-----	18	353	176	66	2
Memphis.....	10	1,256	850	294	112	754	35,320	10,294	12,635	668
Murfreesboro.....	12	45	45	-----	-----	22	532	399	118	-----
Nashville (2).....	23	2,095	1,199	676	220	910	33,651	7,872	8,684	2,182
Ripley.....	10	11	11	-----	-----	7	175	151	37	-----
Trenton and Hum- boldt.....	9	112	85	27	-----	35	1,908	875	179	53
Union City.....	11	107	89	13	5	25	324	146	63	10
Virginia.....	36	1,936	1,285	646	5	110	13,470	6,763	5,102	2,264
Danville.....	12	106	100	6	-----	33	660	436	499	12
Petersburg.....	12	391	297	93	1	48	3,399	2,510	838	227
Richmond.....	12	1,439	888	547	4	29	9,411	3,817	3,765	2,025
Washington.....	36	1,283	677	606	-----	689	22,222	5,346	19,418	17,012
Seattle.....	12	893	421	472	-----	404	14,276	2,931	15,341	13,168
Spokane.....	12	257	177	80	-----	260	6,091	1,521	1,364	1,582
Tacoma.....	12	133	79	54	-----	25	1,855	894	2,713	2,262
West Virginia.....	126	2,069	1,388	636	45	548	30,236	12,813	5,391	3,132
Beckley.....	12	110	69	38	3	17	2,206	1,165	209	74
Charleston.....	12	612	419	159	34	87	7,835	2,153	1,986	601
Clarksburg.....	12	115	78	37	-----	27	1,296	637	199	141
Fairmont.....	12	170	114	54	2	44	3,445	1,505	270	134
Huntington.....	12	196	184	9	3	1	2,800	2,556	798	98
Logan.....	12	401	256	144	1	180	2,343	1,404	728	8
Madison.....	9	81	41	39	1	32	880	196	115	78
Martinsburg.....	1	15	13	2	-----	2	173	83	24	7
Morgantown.....	6	60	22	38	-----	16	753	324	70	38
Parkersburg.....	12	107	70	37	-----	38	4,410	1,299	316	149
Wellsburg.....	2	2	2	-----	-----	1	15	7	13	2
Wheeling (2).....	24	200	120	79	1	103	4,080	1,484	663	1,802
Wisconsin.....	143	1,701	995	705	1	465	28,034	4,990	9,250	5,286
Beloit.....	12	13	3	10	-----	15	240	149	31	-----
Janesville.....	12	27	8	19	-----	30	634	83	90	49
Kenosha.....	12	32	18	14	-----	26	256	155	171	53
La Crosse.....	12	43	14	29	-----	16	1,138	138	170	270
Madison.....	12	130	31	99	-----	41	2,432	239	238	395
Milwaukee (3).....	36	1,265	838	426	1	205	19,870	3,379	7,827	3,719
Oshkosh.....	12	42	25	17	-----	34	832	331	232	128
Racine.....	12	83	37	46	-----	49	812	274	260	85
Superior.....	11	32	21	11	-----	13	1,109	234	222	155
Wausau.....	12	34	-----	34	-----	31	711	8	9	432

NOTE.—States which did not report and those having no reporting clinics have been omitted from the above table; they are Arizona, Idaho, Montana, Nevada, New Mexico, North Carolina, South Dakota, Texas, Utah, Vermont, and Wyoming.

TABLE 7.—*Report of cooperative clinic activities furnished through State health departments from 1919 to 1929*

Year	Number of clinics reporting	New cases admitted	Total treatments given	Cases discharged as arrested or cured	Treatments per case admitted
1919	167	59,092	527,392	14,278	8.92
1920	383	126,131	1,576,542	34,215	12.50
1921	442	140,748	2,108,003	55,467	14.98
1922	541	141,279	2,045,232	60,169	14.48
1923	513	119,217	1,992,631	55,503	16.71
1924	504	118,023	2,147,087	51,658	18.19
1925	495	110,372	2,088,494	47,828	18.92
1926	416	100,776	1,881,380	44,329	18.67
1927	425	107,688	1,964,233	44,701	18.24
1928	451	110,756	2,174,832	49,487	19.64
1929	445	120,315	2,128,417	52,136	17.69

TABLE 8.—*Report of 72 correctional institutions*

New cases admitted:	
Syphilis	5,202
Gonorrhea	3,914
Chancroid	125
Total	9,241
Cases discharged as arrested or cured	6,117
Treatments given	127,145
Doses of arsphenamine administered	31,899
Wassermann tests made	43,435
Microscopic examinations for gonococcus	23,593

TABLE 9.—*Statistical summary of activities in the control of venereal diseases for the fiscal years 1928 and 1929*

Activity	1929	1928
MEDICAL ACTIVITIES		
A. Cases of venereal diseases reported to State health departments:		
I. Syphilis	195,559	¹ 185,437
II. Gonorrhea	156,544	¹ 147,219
III. Chancroid	4,762	¹ 4,834
Total	356,865	¹ 337,490
B. Doses of arsphenamines distributed by State health departments	751,279	¹ 691,370
C. Clinics:		
I. Clinics established during the year	25	31
II. Clinics reporting to State health departments	445	451
III. Report from clinics—		
a. New cases admitted	120,315	¹ 110,756
b. Cases discharged as arrested or cured	52,136	¹ 49,487
c. Treatments given	2,128,417	¹ 2,174,832
d. Doses of arsphenamines administered	554,545	¹ 537,629
e. Wassermann tests made	367,075	¹ 348,384
f. Microscopic examinations for gonococcus infection	170,893	¹ 171,941
D. Requests for medical information received by the Public Health Service	326	349
EDUCATIONAL ACTIVITIES		
A. Pamphlets:		
I. Requests for pamphlets received by the Public Health Service	14,360	12,608
II. Pamphlets distributed—		
a. By the Public Health Service to—		
1. State health departments	13,286	6,964
2. Others	² 384,715	186,407
Total	398,001	193,371
b. By State health departments	795,311	695,018
c. Gross total pamphlets distributed	1,193,312	888,389
Minus pamphlets distributed by the Public Health Service to State health departments	13,286	6,964
d. Net total pamphlets distributed	1,180,026	881,425
III. Venereal disease pamphlets issued by the Public Health Service	2	5

¹ Changed from previously published 1928 figures because of additional data received.² Includes 293,701 pamphlets sold.

TABLE 9.—*Statistical summary of activities in the control of venereal diseases for the fiscal years 1928 and 1929—Continued*

Activity	1929	1928
EDUCATIONAL ACTIVITIES—continued		
B. Lectures, films, exhibits, and slide showings:		
I. Lectures, films, exhibits, and slide showings reported by the—		
a. Public Health Service.....	128	
b. State health departments.....	2, 684	¹ 3, 568
Total.....	2, 812	¹ 3, 568
II. Average attendance reported by the—		
a. Public Health Service.....	190	
b. State health departments.....	98	106
Total.....	103	106
III. Motion-picture films, strip films, exhibits and lantern-slide sets loaned by the Public Health Service to—		
a. State health departments.....	3	5
b. Public Health Service field officers.....	1	1
c. Others.....	30	155
Total.....	34	161

¹ Changed from previously published 1928 figures because of additional data received.

NARCOTICS DIVISION

In charge of Surg. W. L. TREADWAY

Legislation enacted during the course of the fiscal year ended June 30, 1929, authorized the establishment of two institutions for the confinement and treatment of persons addicted to the use of habit-forming narcotic drugs who have committed offenses against the United States and of addicts who voluntarily submit themselves for treatment. The act was approved on January 19, 1929, and created within the office of the Surgeon General a new division, known as the "Narcotics division," which is charged with the responsibility of managing these institutions, with the discipline, and with the methods of treatment of those admitted.

This legislation may be regarded as supplemental to and indirectly bearing upon the enforcement of "Federal narcotic laws"; for, through segregation, care and rehabilitation of drug addicts the assumption prevails, in some quarters at least, that the illicit traffic in habit-forming drugs will decrease. The law proposes that the institutions be designed to rehabilitate, restore to health, and, where necessary, train to be self-supporting and self-reliant, those persons addicted to the use of habit-forming drugs who are confined in or admitted thereto. The narcotics division was placed in charge of Surg. Walter L. Treadway on January 23, 1929, and a deficiency appropriation for preliminary expenses incident to operating the new division was made available on March 4, 1929.

A preliminary survey regarding the epidemiological features of drug addiction was completed during the course of the fiscal year ended June 30, 1929. This preliminary survey, however, pointed to the necessity for further inquiries along this line. Plans have been perfected for obtaining during the course of the next succeeding fiscal year more definite and detailed information respecting the geographical distribution and individual characteristics of the prospective inmates of these institutions. Further studies have also been outlined in an effort to evaluate the past experiences of States and local jurisdictions in the matter of their attempting to solve this medicosocial problem.

DIVISION OF PERSONNEL AND ACCOUNTS

In charge of Asst. Surg. Gen. C. C. PIERCE

As heretofore, the division of personnel and accounts has supervised all operations of the service relating to personnel, finances, and the maintenance of property records. The organization of the division has remained unchanged during the year, and consists of a personnel section, a finance section, and a property record section.

During the latter part of the fiscal year 1928, the salaries of all field personnel of the service were adjusted in accordance with the act of May 28, 1928, known as the Welch Act. The intent of the act was to adjust the compensation of field employees to correspond, as nearly as might be found practicable, to the rates of pay provided for similar positions in the departmental service in Washington under the reclassification act. Somewhat more than 4,000 field employees received adjusted compensation under this legislation.

During the present fiscal year, the bureau has cooperated with the Personnel Classification Board in its survey, preparatory to making a report to Congress, of all field positions with a view to making recommendations in the matter of the reclassification of field positions. Schedules of all field positions, with recommended allocations to grades and services, were furnished the board, and representatives of the bureau worked with the board in drafting specifications for the various classes of positions throughout the service, based upon the study of individual job-description sheets furnished by field stations. It is understood that printed specifications covering all grades and classes of positions throughout the Government service are now in course of preparation by the board.

During the fiscal year just closed the number of resignations of officers holding commissions in the regular corps of the service has been greater than in any previous year in service history. From June 30, 1928, through the month of July, 1929, 16 officers submitted their resignations. All of these officers were in the grade of assistant surgeon, with a single exception, who was in the grade of surgeon. This number of resignations, added to 2 deaths among officers on active duty and 4 officers placed on "waiting orders" because of physical disabilities, made a reduction of 22 from the number on active duty.

Examinations of candidates for assistant surgeon, the entrance grade of the commissioned corps, were held on November 5, 1928, February 4, 1929, and April 29, 1929. Each of these examinations was held in Washington, D. C., New Orleans, La., Chicago, Ill., and San Francisco, Calif. The examination on April 29, 1929, was also held in New York City. Although announced by notices printed in medical journals and sent to hospitals and medical schools throughout the country, only 39 physicians with the requisite qualifications as to age, professional education, and experience appeared for the examination. Of this number, 19 were successful in passing the examination, and of those who passed, three subsequently declined

to accept commissions. There were therefore only 16 additions to the regular corps, as compared with 22 separations, during the year.

The difficulty of securing adequately trained young physicians who are willing to enter upon a career as commissioned officers of the Public Health Service, and of retaining in the service those who pass the entrance examination, is believed to be due in large measure to the low compensation provided by law for the entrance grade of assistant surgeon. Elsewhere in this report this subject is discussed more fully in connection with recommendations for legislation which will, it is believed, remedy the situation.

Under date of August 1, 1928, a circular letter was issued prescribing an annual physical examination for all commissioned officers of the service, both regular and reserve, on active duty. Blank forms, for recording in detail the results of this examination and a statement by the officer of his medical history, have been supplied, and these forms are required to be completed and forwarded to the bureau once each year. It is believed that this measure will result in increased efficiency and improved general health throughout the corps.

There are given below summarized reports of the activities of the directors in the six public-health districts of the country. Information relating to changes in the number of various classes of service personnel, together with a tabulated statement of all personnel on duty on June 30, 1929, is also set forth under appropriate headings.

PUBLIC HEALTH DISTRICTS

On August 1, 1928, Senior Surg. E. K. Sprague was assigned to duty as director of public health district No. 1, succeeding Senior Surg. C. H. Lavinder, who was detailed as chief medical officer of all service activities at Ellis Island, N. Y.

The director reports that all important stations in the district were inspected during the year, and at some of the larger stations several inspections were made. Inspection visits are made the occasion for surveying worn out and unserviceable property on hand, and recommendations for the disposition of such property have been made.

A number of extensive special investigations have been made during the year on various subjects, including inquiries into compensation cases made at the request of the Employees' Compensation Commission.

Numerous conferences have been held with officials representing other Government departments, with civic organizations, and with organizations interested in welfare and public health matters. Contact was maintained with State and local health officers in the State of Maine during the winter months, in connection with the suppression of an epidemic of smallpox.

Surg. B. S. Warren continued on duty as director of district No. 2 throughout the fiscal year. The State of Georgia, heretofore a part of the fourth district, was added to the second district early in the fiscal year. Practically all stations in the district were visited and inspected. These stations included the United States marine hospitals at Baltimore, Pittsburgh, Norfolk, Louisville, Memphis, and Savannah; second-class relief stations at Washington, D. C., and Philadelphia, Pa.; 19 third-class relief stations; 2 fourth-class relief

stations; 11 quarantine stations; 10 immigration stations; the supply depot at Perry Point, Md.; the Hygienic Laboratory at Washington, D. C., and the trachoma hospital located at Richmond, Ky.

Special investigations conducted by the district director during the year included an investigation of sanitary conditions in the post office at Cameron, W. Va.; an investigation of the diet department at the Savannah Marine Hospital; investigation of an accident aboard the steamship *Matra* at the Baltimore quarantine station; an investigation of misappropriation of sulphur at the fumigation station, Philadelphia, Pa.; four cases of charges against officers of the service; and an investigation of the circumstances in connection with cases of acute illness reported at the Baltimore Marine Hospital incident to the use of homatropin as a mydriatic.

Conferences were held with the State health commissioners of Georgia, Virginia, Kentucky, West Virginia, Tennessee, Pennsylvania, North Carolina, South Carolina, and Maryland, relative to public-health matters. A conference was also held with State health authorities at Little Rock, Ark., regarding the supervision of cooperative rural health studies and demonstrations in that State.

Surg. A. J. McLaughlin was detailed as director of district No. 3, effective August 1, 1928, succeeding Senior Surg. S. B. Grubbs.

In the early part of the fiscal year, inspections were made of third-class relief stations and Coast Guard stations at St. Joseph, South Haven, Holland, Grand Haven, Muskegon, Montague, and Ludington, Mich.; Rock Island, Ill.; and Manistee, Frankfort, Alpena, Harrisville, and East Tawas, Mich. A special report of inspection of the relief station at Toledo, Ohio, was also made, as well as of the station at Rogers City, Mich.

The marine hospitals at St. Louis, Chicago, Cleveland, and Detroit were also inspected, and surveys of unserviceable property, with recommendations for condemnation or other disposition, were made at the Chicago, St. Louis, and Cleveland hospitals. Conferences were held with the medical officers in charge of these hospitals, as well as with the district engineer in Chicago, in connection with service work in the district.

Investigations and reports to the bureau were made in three cases at service stations in the district where charges of irregularities or improper administration were involved. The case of a Veterans' Bureau beneficiary, who had been fraudulently representing himself as an officer of the Public Health Service, was also investigated.

Meetings of the American Public Health Association and of the Mississippi Valley Tuberculosis Association were attended, and reports were made thereon. Conferences were held with the Governor and State health officer of Iowa, the president of the University of Iowa, and the dean of the College of Medicine, University of Iowa, regarding the methods of the State health department in the control of communicable diseases and in child hygiene work, and cooperative relations between the State health department and the University of Iowa. A special report, with recommendations, was rendered to the Governor of Iowa on the matter. Contact with other State and local health authorities in the district was maintained as occasion offered.

On January 29, the director of district No. 3 was ordered to Washington preparatory to departure for Europe, having been selected, in response to a request from the League of Nations, to serve with four others on an international committee to make a survey of health and sanitary conditions in Greece, with report and recommendations. This duty lasted from February 6 to May 20, 1929.

Senior Surg. John McMullen served as director of the fourth public health district throughout the fiscal year.

The five marine hospitals, 12 of the 16 relief stations, and 30 of the 36 quarantine stations in the district were visited and inspected. At a number of these stations unserviceable property was surveyed and recommendations were made as to its disposal.

In September, 1928, the director was ordered to Florida for duty in cooperation with the State health officer and the American Red Cross, in relief measures following the West Indian hurricane in Palm Beach County and vicinity. This duty continued throughout the month. The territory was revisited in April, 1929, at the request of and in company with the State health officer.

Visits were made to Corpus Christi, Tex., in connection with matters relating to the establishment of a relief station at that place; to Port Aransas and Aransas, Tex., in connection with quarantine matters; to Galveston, Tex., with the district engineer of the supervising architect's office, for the purpose of inspecting sites offered for the construction of the new marine hospital at that place; Sabine, Tex., for the purpose of selecting a quarantine site; Beaumont, Tex., to determine whether a relief station should be established; and to Mobile, Ala., and Vicksburg, Miss., in connection with other service matters. Trips were also made to the National Leprosarium at Carville, La., for conference with representatives of the Army Engineering Corps regarding relocation of the levee at that station; and to Fort Lauderdale, Fla., to investigate reports concerning the medical officer employed at that place.

In the early part of 1929, the director visited all stations on the Texas-Mexican border, reporting on the activities and needs of each station, with a view to further improving the quarantine and immigration work on the border.

Contact has been maintained with the various State health officials in the territory covered by the district.

In public health district No. 5, Senior Surg. J. C. Perry has served as district director during the entire fiscal year. All stations in the district, with the exception of certain Mexican border stations, were inspected. Extra work developing in the latter part of the year in connection with measures to prevent the introduction of cerebrospinal meningitis prevented further inspections.

During the year, further coordination of service activities at California stations received the attention of the director. A particular instance of this character has been the handling of the meningitis problem, through concerted action by the quarantine, immigration, and public health laboratory agencies.

Numerous special investigations and reports were made during the year on complaints and on other minor matters originating in the district. The director also served on examining boards at various times, and on a board to study the problem of meningitis on vessels en route from the Orient to the West Coast.

Cordial cooperation has been maintained with State and local health authorities. Numerous conferences were held with county horticultural commissioners in California regarding measures for the control and eradication of ground squirrels, as a plague suppressive measure.

The examination and vaccination of personnel starting for the Alaska salmon canneries were performed again this spring, as for several years past. This action has been taken to meet requirements of the commissioner of health of Alaska, and the different companies sending employees to that territory cooperate to the fullest extent in this work, its efficacy having been demonstrated by the reduction in the number of smallpox cases which occur annually.

The director of the fifth district also continued in charge of the activities of the service in connection with the suppression of bubonic plague infection in ground squirrels in California, the rat surveys conducted in San Francisco, and the work of the Public Health Service laboratory in that city.

Senior Surg. L. D. Fricks has continued as director of the sixth district throughout the fiscal year. The marine hospital at Port Townsend, Wash., relief stations at Portland, Oreg., and Seattle, Wash., and 14 third-class relief stations in the district were inspected during the year. All quarantine stations were also inspected.

An important work of the director during the year has been that of visiting and instructing acting assistant surgeons at the smaller stations in the district in matters pertaining to their service work, such as regulations, paper work, and other administrative details. He reports that this effort has met with considerable success, and has been appreciated by the officers concerned.

Much attention has also been given to the reorganization of quarantine activities at Columbia River ports, especially complaints received at the time fumigations were begun at Portland which had formerly been conducted farther down the river.

Numerous outbreaks of epidemic-cerebrospinal meningitis on trans-Pacific liners entering Puget Sound during the year constituted a serious quarantine and public health problem. The director assisted in handling these outbreaks and kept in close touch with State and city health authorities, with whom close cooperation was maintained during the four months over which the outbreaks were spread.

Considerable time was also devoted to the selection of a site for the new marine hospital at Seattle. In cooperation with the chamber of commerce of that city, the selection of a site was satisfactorily adjusted.

All State health officers within the district were visited during the year for conference regarding public health matters. Correspondence was also maintained with the commissioner of health of Alaska, particularly in regard to the medical examination and vaccination of cannery employees.

COMMISSIONED MEDICAL OFFICERS

On July 1, 1928, the regular corps consisted of the Surgeon General, 3 assistant surgeons general at large, 24 senior surgeons, 133 surgeons, 23 passed assistant surgeons, and 64 assistant surgeons. Of this number, aggregating 248, 2 assistant surgeons general at large, 12

senior surgeons, 4 surgeons, and 2 passed assistant surgeons were on waiting orders. During the fiscal year the following changes occurred in the several grades: 2 surgeons were promoted to the grade of senior surgeon to fill vacancies created by placing 2 senior surgeons on waiting orders; 4 passed assistant surgeons were promoted to the grade of surgeon; 7 assistant surgeons were promoted to the grade of passed assistant surgeon; 3 candidates for appointment to the grade of assistant surgeon were successful in the entrance examination prescribed by law and the regulations of the service and were commissioned in that grade; 1 assistant surgeon who successfully passed the examination declined his commission; 2 senior surgeons and 1 surgeon were placed on waiting orders because of physical disability; 11 assistant surgeons resigned from the service; 1 senior surgeon on waiting orders and 2 surgeons on active duty died.

On June 30, 1929, after these changes had occurred, the regular corps consisted of the Surgeon General, 3 assistant surgeons general at large, 25 senior surgeons, 133 surgeons, 26 passed assistant surgeons, and 48 assistant surgeons. Of these 236 officers, 2 assistant surgeons general at large, 13 senior surgeons, 5 surgeons, and 2 passed assistant surgeons were on waiting orders.

At the close of the fiscal year 1929, 1 senior surgeon and 6 surgeons were serving by detail as assistant surgeons general in charge of divisions of the bureau in accordance with the acts approved July 1, 1902, and July 9, 1918. Four senior surgeons and 2 surgeons were on duty as directors of public-health districts. One surgeon and 1 assistant surgeon were serving (the surgeon as chief surgeon) on detail to the Bureau of Mines, Department of Commerce, and 1 surgeon and 2 passed assistant surgeons were serving (the surgeon as medical director) on detail to the United States Employees' Compensation Commission. Two surgeons were assigned as assistants to the Director, Pan American Sanitary Bureau, Washington, D. C. Four surgeons were serving on detail to the Bureau of Indian Affairs, Department of the Interior, in connection with the control of communicable diseases among the Indians.

RESERVE OFFICERS

On July 1, 1928, the reserve commissioned officers on active duty numbered 65, consisting of 1 assistant surgeon general, 1 senior dental surgeon, 8 surgeons, 7 dental surgeons, 8 passed assistant surgeons, 14 passed assistant dental surgeons, 23 assistant surgeons, and 3 assistant dental surgeons.

On July 1, 1929, the number of reserve officers on active duty was 65, consisting of 1 assistant surgeon general, 1 senior dental surgeon, 8 surgeons, 7 dental surgeons, 12 passed assistant surgeons, 16 passed assistant dental surgeons, 15 assistant surgeons, and 5 assistant dental surgeons.

ATTENDING SPECIALISTS

On July 1, 1928, there were 190 attending specialists in the service and during the year this number increased to 212, of which number 172 were consultants to marine hospitals, while 40 were available for call at second and third class relief stations.

ACTING ASSISTANT SURGEONS

On July 1, 1928, there were 488 acting assistant surgeons in the Public Health Service, and by July 1, 1929, this number had increased to 596.

Of the 596 acting assistant surgeons on duty July 1, 1929, 101 were on duty at marine hospitals; 317 were engaged in immigration, relief, and maritime, border, insular, and foreign quarantine work, while 5 were engaged in the prevention of trachoma; 14 were on duty in connection with field investigations of public health and rural sanitation; 1 was engaged in national-park sanitation; 102 were on detail with the United States Coast Guard; 5 were serving with the Bureau of Mines by detail; and 51 were engaged in antivenereal disease activities as part-time employees at nominal compensation. Twenty-eight of the fifty-one acting assistant surgeons engaged in antivenereal disease activities held appointments as collaborating epidemiologists.

INTERNES

On July 1, 1928, there were 12 internes in the service; on July 1, 1929, there were 62, of whom 11 were dental and 3 students. Internes are appointed for temporary periods of one year for duty at marine hospitals.

CONTRACT DENTAL SURGEONS

On July 1, 1928, there were 36 contract dental surgeons employed at marine hospitals and second, third, and fourth class relief stations. These part-time employees are appointed for local duty and receive fixed and uniform fees for dental work performed for service beneficiaries.

At the close of the fiscal year, 8 contract dental surgeons were at marine hospitals; 27 were at second, third, and fourth class relief stations; and 2 were detailed to the United States Coast Guard for duty.

EPIDEMIOLOGISTS

The number of assistant collaborating epidemiologists was increased slightly during the fiscal year. These employees are health officers or employees of State or local boards of health, who receive only nominal compensation from the Federal Government, and who furnish the service with reports of communicable diseases received by State or local health organizations. During the year, the number of collaborating epidemiologists remained at 43, these appointees being on duty in the different States, and the number of assistant collaborating epidemiologists was increased from 4,427 to 4,555. Twenty-eight of the collaborating epidemiologists also hold appointments as acting assistant surgeons under the division of venereal diseases.

HYGIENIC LABORATORY

At the close of the fiscal year, the personnel of the Hygienic Laboratory included, in addition to the director and assistant director, 3 chiefs of divisions, 5 surgeons, 4 passed assistant surgeons, 1 assistant surgeon, 1 pharmacist, 5 special experts, 1 consultant pathologist, 1 consultant syphilologist, 1 consultant dermatologist, 1 consultant cytologist, 1 consultant chemist, 3 senior chemists, 2 chemists, 4

assistant chemists, 2 junior chemists, 1 biochemist, 1 pathologist, 1 physiologist, 2 bacteriologists, 1 associate bacteriologist, 1 assistant bacteriologist, 1 senior pharmacologist, 2 pharmacologists, 1 assistant pharmacologist, 1 senior microanalyst, 1 biophysicist, 1 bacteriological technician, 1 artist, 14 other technical employees, 10 administrative and clerical employees, and 52 laboratory attendants and others.

PHARMACISTS AND ADMINISTRATIVE ASSISTANTS

At the close of the fiscal year, there were on duty in the service 31 pharmacists and 20 administrative assistants. The number of pharmacists decreased by 4 during the fiscal year. The appointment of one additional administrative assistant was responsible for the increase in this class of personnel.

At the end of the fiscal year the pharmacists and administrative assistants were classed as follows:

Chief pharmacists-----	27
Junior pharmacists-----	4
Administrative assistants (first class)-----	5
Administrative assistants (second class)-----	10
Administrative assistants (third class)-----	4
Administrative assistants (fourth class)-----	1

BOARDS

During the fiscal year 1929, 151 boards were convened for various purposes throughout the service, as follows: 12 for the medical examination of detained aliens; 16 for the examination of commissioned officers to determine their fitness for promotion; 13 for the examination of applicants for commissions in the grade of assistant surgeon in the regular corps; 3 for the examination of scientific personnel for promotion; 2 for inspecting service property; 10 to make physical examinations of certain officers of the Public Health Service; 81 for the purpose of making physical examinations in connection with the appointment, promotion, and retirement of commissioned officers, warrant officers, and cadets in the United States Coast Guard; 2 to consider the revision of the quarantine regulations; 1 to investigate circumstances attending the fumigation of the steamer *Steel Inventor*; 1 for the study of morbidity reports; 3 to report on condition and disposal of various quarantine tugs; 3 to investigate quarantine measures on the Pacific coast for the prevention of the introduction of cerebrospinal meningitis from the Far East; 2 to investigate loss of certain property from certain marine hospitals; 1 to study requirements that the service should impose for color vision tests for various classes of candidates; 1 to secure information in connection with the location of the United States marine hospital on Staten Island, N. Y.

The board of medical officers of the Public Health Service established May 24, 1923, as an advisory board to the chairman of the Employees' Compensation Commission to assist in the consideration of compensation claims based on injuries and occupational diseases, reviewed and reported upon 15 cases referred to it by the chairman during the fiscal year.

PROPERTY RECORDS

The property-record section has accounted for all property of the service and property returns for 309 stations have been audited during the year. Sales of unserviceable property (including boats), livestock, hides, and old metals, aggregated \$9,666.86. Surplus property not desired by any other Government department was sold for \$448.05. Property surplus to the Public Health Service valued at \$10,261.99 has been transferred to other Government departments. Property valued at approximately \$18,000 has been transferred from service stations where it was surplus to other service stations where it could be used.

ACCOUNTS SECTION

The accounts section of the division of personnel and accounts has conducted all bookkeeping and accounting work in connection with the expenditure of appropriations, miscellaneous collections, allotments and encumbrances, cost accounting, and the administrative audit. As an appendix to this report, a statement of appropriations, expenditures, and balances for the fiscal year 1929 is presented.

PERSONNEL STATEMENT

There follows a detailed statement setting forth the total personnel of the Public Health Service, both departmental and field, as of July 1, 1929. In the total of 9,618 shown in this table, 4,555 collaborating epidemiologists and assistant collaborating epidemiologists are included. These are appointees with nominal compensation only, who assist in the collection of morbidity statistics throughout the country. The total also includes part-time employees, those holding fee-basis appointments, and those paid on a per diem basis when actually employed.

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Personnel of the Public Health Service—Continued

	General and technical												Totals				
	Assistant collaborating epidemiologist	Scientific-Hygienic laboratory	Administrative assistant	Druggist	Nurse	Aide	Dietitian	Laboratorian in Röntgenology	Laboratorian in bacteriology	Pilot	Marine engineer	Clerk	All other employees	Medical and scientific	General and technical	Sub	Grand
BUREAU																	
Surgeon General's office.....												3	2	2	5	7	
Chief clerk's office.....												28	23	13	51	51	
Divisions.....				2								125	5	16	132	145	
Detailed to other offices.....																16	
Total.....														31	188		219
FIELD																	
Coast Guard.....																	
Perry Point, Md.....												4	8	118	12		118
Public Health districts.....			1									5		1	6		13
Waiting orders.....														7			13
														22			22
Hospital division:																	
Marine Hospital Baltimore, Md.....			1		22	2	2	1	2			8	58	34	96	130	
Marine Hospital Boston, Mass.....			1		18	1		1	1			8	59	21	89	110	
Marine Hospital Buffalo, N. Y.....					13	1	1		1			3	25	17	44	61	
Marine Hospital Carville, La.....			1	1								6	10	270	280		
Marine Hospital Chicago, Ill.....				1	18	1	2	1	1			8	53	33	85	118	
Marine Hospital Cleveland, Ohio.....					13							7	28	16	49	65	
Marine Hospital Detroit, Mich.....					10	1			1			5	26	18	42	60	
Marine Hospital Ellis Island, N. Y.....			2		48	3	4	1	1			10	179	23	248	271	
Marine Hospital Evansville, Ind.....					5							2	16	7	23	30	
Marine Hospital Fort Stanton, N. Mex.....			1		9	3	2					10	109	10	134	144	
Marine Hospital Key West, Fla.....					9							2	19	7	30	37	
Marine Hospital Louisville, Ky.....					7							4	22	14	33	47	
Marine Hospital Memphis, Tenn.....					10			1	1			2	21	11	30	41	
Marine Hospital Mobile, Ala.....					6	1		1	1			4	33	15	50	65	

Marine Hospital New Orleans, La.....	1	1	34	2	1	1	2	18	125	43	185	228
Marine Hospital New York, N. Y.....	1	1	6	5	1	1	1	10	45	39	68	107
Marine Hospital Norfolk, Va.....	1	1	24	2	2	1	1	10	83	21	124	145
Marine Hospital Pittsburgh, Pa.....	1	1	11	1	1	1	1	4	21	14	38	52
Marine Hospital Portland, Me.....	1	1	8	1	1	1	1	2	34	15	46	61
Marine Hospital Port Townsend, Wash.....	1	1	12	1	1	1	1	2	28	5	42	47
Marine Hospital St. Louis, Mo.....	1	1	7	1	1	1	1	6	22	20	36	56
Marine Hospital San Francisco, Calif.....	1	1	35	3	2	1	1	8	98	35	151	186
Marine Hospital Savannah, Ga.....	1	1	16	1	1	1	1	5	42	18	67	85
Marine Hospital Stapleton, N. Y.....	1	1	36	3	2	2	1	13	115	25	172	197
Marine Hospital Vineyard Haven, Mass.....	1	1	2	1	1	1	1	1	8	3	11	14
Total hospitals.....										474	2,163	2,637
Relief stations:												
Second class.....	1	1	3	1	1	1	1	17	10	69	34	103
Third class.....			1					10		108	11	119
Miscellaneous.....										3		3
Total relief stations.....										180	45	225
Foreign quarantine division:												
Baltimore, Md.....	1	1										
Boston, Mass.....	1	1	1									
Ellis Island, N. Y., immigration.....												
El Paso, Tex.....												
Galveston, Tex.....												
Port Monroe, Va.....												
Laredo, Tex.....												
Marcus Hook, Pa.....	2	2	2									
New Orleans, La.....												
Rosebank, N. Y.....	2	1	1									
San Francisco, Calif, immigration and quarantine.....												
San Juan, P. R.....												
Foreign ports.....												
All others.....		1	3									
Total.....										303	675	978
Domestic quarantine division:												
San Francisco, Cal.....												
Interstate.....												
Trachoma.....			9									
Rural sanitation.....			33									
All others.....			3									
Total.....										29	371	400

Personnel of the Public Health Service—Continued

	General and technical												Totals				
	Assistant collaborating epidemiologist	Scientific-Hygienic laboratory	Administrative assistant	Druggist	Nurse	Aide	Dietitian	Laboratorian in Röntgenology	Laboratorian in bacteriology	Pilot	Marine engineer	Clerk	All other employees	Medical and scientific	General and technical	Sub	Grand
FIELD—continued																	
Scientific research division:		33										8	64	16	105	121	
Hygienic laboratory												1	5	6	6	12	
Leprosy investigation												4	10	2	14	16	
Malaria												2	8	2	10	12	
Nutrition studies												3	14	15	17	32	
Stream pollution																4	
Sewage disposal												12	7	36	19	55	
Industrial hygiene and sanitation					1	1						9	2	7	13	20	
Child hygiene					1							8	4	5	13	18	
Statistical office			1									11	36	23	48	71	
All others																	
Total														116	245		361
Sanitary reports and statistics division	4,555														4,555		4,555
Veneral diseases division					1				1			1	10	60	73		73
Miscellaneous			1									2		1	3		4
Total	4,555	33	20	9	442	33	19	14	16	36	39	466	2,594	1,342	8,276		9,618

NURSING, DIETETIC, AND RECONSTRUCTION SECTION

The administrative duties of the nursing section were carried on as usual with a superintendent of nurses, an assistant superintendent of nurses, and one clerk, who is secretary, stenographer, and clerk. This force is generally sufficient to keep the work current.

There has been an increase in the number of nurses on duty, due to the increase in bed capacity. In the next year there should be a marked increase, because of the opening of new hospitals and the increase of beds in already existing stations. There are on duty at present in the marine hospitals and relief stations of the Public Health Service 386 nurses, 36 aides, 20 dietitians, and 3 social workers; in connection with the work relating to maritime quarantine, 3 nurses; in domestic (interstate) quarantine, 11 nurses; in field investigations of the public health, 2 nurses. The turnover has been materially decreased, there having been 83 resignations during the fiscal year ended June 30, 1929, as against 160 last year, and with a greater number of nurses in 1928-29. There were 40 releases, 1 death, 94 appointments, 38 reinstatements. Under the provisions of the Welch Act the nurses, aides, and dietitians all received an advance in pay, which has probably been the greatest factor in stabilizing the service and in cutting down the number of resignations.

In recommending transfers care is exercised that travel expenses be kept at the minimum. All new appointees and reinstatements defray their own travel expenses to first post of duty. Of the nurses, aides, and dietitians transferred, 85 traveled at Government expense, 96 paid their own transportation, and for 99 there was no expense involved.

There were 259 nurses certified by the civil service, of whom 11 were selected and 46 declined appointment; 89 of this number were recruited by the nursing section of the Public Health Service.

There is still difficulty in securing properly trained male reconstruction assistants. The chief aides are now training their own assistants, and this method has proved satisfactory.

The situation in regard to quarters has been improved at some stations, and at those stations there has been created a more satisfactory attitude among members of the nursing service.

There is still the matter of lack of promotion in pay for length of service and of too long tours of duty in isolated stations, and the requirement that transportation to first post of duty be paid by the appointee is sometimes a deterrent to acceptance of appointment.

Legislation placing this nursing service on the same basis as that of the Army and Navy is a matter of vital importance to its stability and efficiency. This legislation should be so worded as to provide recognition of previous service in the Army, Navy, and Public Health Service in estimating longevity or retirement; the same method of appointments as the Army and Navy; and that all privileges now accorded to the Army and Navy nurses be made available for nurses of the Public Health Service.

Cooperative activities have been carried on as usual with other Government departments and with the American Red Cross.

The courses of weekly lectures to senior students of the Army School of Nursing have been given as usual. The past year these lectures were made available to senior students from other schools of nursing in the District of Columbia; Gallinger, Emergency, St. Elizabeths, and George Washington Hospitals sent their student nurses. The usual contacts with schools of nursing and nursing organizations have been maintained. Many requests for literature concerning the nursing service of the Public Health Service are received from the nursing schools, and information in regard to nursing in the Government is now included in the curriculum of a number of the schools throughout the country.

Two nurses were released temporarily for duty with the Red Cross in Porto Rico and gave very satisfactory service. Two nurses of the Public Health Service were detailed for duty to the Department of Agriculture during the period of the 4-H encampment from June 19 to 26, 1929.

Supervision of the rest room maintained at the bureau has been carried on as usual. This rest room serves a useful purpose not only in giving temporary relief to sick employees, but as an agency for better morale and friendliness among members of the service.

The nursing section, with the approval of the Surgeon General, is assisting in the organization of a welfare association among employees.

The total of 1,250 visits made to the emergency room included 335 men and 785 women employees of the Public Health Service, and 86 men and 46 women from other departments. The increasing use of the emergency room by persons other than Public Health Service employees necessitated the placing of a notice stating: "For Public Health Service employees only." Others are treated only in emergencies.

THE CHIEF CLERK'S OFFICE

PERSONNEL ON DUTY IN THE BUREAU

The number of civil-service employees on duty in the bureau at the end of the fiscal year was 192, the same number as in the preceding fiscal year. A reduction of one employee in the hospital division was offset by the appointment of an employee to the new narcotics division established by the act approved January 19, 1929.

The act of May 28, 1928, amending the salary rates of Federal employees, resulted in an average salary increase of \$98 per employee, and there were also 63 one-step promotions made during the fiscal year.

There was a turnover of 14 per cent in the force as a whole, but it is interesting to note that more than seven-tenths of these changes occurred in grades where there are 10 or more employees, viz, grades CAF 2, 3, and 4. On account of the rather heavy turnover in these grades the "average provision clause" of the annual appropriation act did not interfere with the promotion of deserving employees possessing the necessary eligibility. However, in the 13 other grades where there are less than 10 employees per grade and where the turnover was very small, the "average provision clause" prevented a number of merited promotions to employees having high efficiency ratings. If the same exception to the "average provision" now operative in grades in which there is only one employee, viz, not more than 1 promotion every fiscal year, regardless of the average, existed also as to grades having from 2 to 10 employees, it would then be possible to recognize deserving employees in these grades who have heretofore had less promotion possibilities than those situated in the larger grades or in grades by themselves.

The number of cases of tardiness was 1.1 per employee as compared with 1.7 during the preceding year. The average sick leave for the year was 8.5 days per employee.

PUBLIC HEALTH SERVICE LIBRARY

The additions to the library during the year comprised 410 bound volumes and approximately 265 pamphlets. These books and pamphlets were procured largely by gift and exchange, only 40 volumes having been obtained by purchase. The library now contains 12,185 volumes and approximately 6,240 pamphlets. Periodicals of a medical and scientific nature to the number of 252 were regularly received and circulated to officials interested. Of these periodicals, 31 were paid subscriptions, the remainder being received gratuitously or by exchange. Approximately 140 monthly and weekly bulletins from State, city, and foreign health departments were also received and circulated.

The removal of the library from the Butler Building to Building "C" rendered it practicable to provide greatly enlarged space and thus to relieve the previous congested condition. This has made it

possible to rearrange the material to advantage and to materially increase the usefulness of the library. It also made possible the consolidation of the branch library previously maintained in Building "C" and the library of the venereal disease division with the main bureau library.

PRINTING AND BINDING

The allotment from the Treasury Department printing appropriation for the use of the Public Health Service, amounting to \$91,000, proved to be seriously inadequate to meet the pressing needs of the service in the printing of publications. It therefore became necessary to lay aside a number of valuable manuscripts until near the end of the fiscal year, when the department found it practicable to add to the allotment from funds which had become surplus in other allotments. The total expenditures for printing and binding for the Public Health Service during the year were \$102,264.76. Of this amount, \$8,392.91 was spent for the printing of blank forms and records.

BUILDINGS AND OFFICE QUARTERS

On April 19, 1929, the divisions of the bureau housed in the Butler Building, located at New Jersey Avenue and B Street SE., were transferred therefrom to Building "C" at No. 16 Seventh Street SW. This action had become necessary because of legislation recently enacted by Congress providing for the removal of the Butler Building and the erection on the site of an office building for the House of Representatives. The Butler Building was purchased by the Government on April 10, 1891, from Benjamin F. Butler for the sum of \$275,000 in pursuance of an act of Congress of March 3, 1891. The Bureau of the Public Health Service (then known as the Marine Hospital Service) moved into the Butler Building on June 11, 1891, and continued to occupy it until April 19, 1929, as above stated.

IMPROVEMENTS AND ECONOMIES

The abandonment of the Butler Building and the transfer of the bureau divisions, files, and records, heretofore housed therein to close proximity to the remainder of the bureau in Building "C" made possible improved administration and increased efficiency. The chief clerk's office was able to release three employees and still give better service, and the Surgeon General's office was brought in closer contact with all parts of the bureau.

The property record system concerning bureau property was consolidated and improved. Heretofore three sets of records had been maintained, according to the appropriations from which equipment was purchased, but these several records are now consolidated into one system.

Progress has been made in the elimination of useless blank forms and also in the further systematization of the files and records system.

APPENDIX

FINANCIAL STATEMENT

The following is a statement of expenditures from appropriations for the Public Health Service for the fiscal year 1929:

Appropriation	Appropriated	Obligations			Unobligated balance
		Incurred	Liquidated	Outstanding	
Salaries, office of Surgeon General, Public Health Service.....	\$319,480.00	\$316,989.38	\$316,989.38	-----	\$2,490.62
Pay, etc., commissioned officers and pharmacists, Public Health Service.....	1,229,574.00	1,225,658.76	1,223,780.62	\$1,878.14	3,915.24
Pay of acting assistant surgeons, Public Health Service.....	328,140.00	327,690.51	327,690.51	-----	449.49
Pay of other employees, Public Health Service.....	1,078,670.00	1,071,323.73	1,071,323.73	-----	7,346.27
Freight, transportation, etc., Public Health Service.....	29,000.00	28,491.64	25,491.09	3,000.55	508.36
Maintenance, Hygienic Laboratory, Public Health Service.....	43,000.00	42,517.65	42,144.41	373.24	482.35
Preparation and transportation of remains of officers, Public Health Service.....	2,000.00	544.59	295.24	249.35	1,455.41
Books, Public Health Service.....	500.00	487.91	476.37	11.54	12.09
Pay of personnel and maintenance of hospitals, Public Health Service ¹	¹ 6,086,766.00	6,053,618.16	6,025,624.75	27,993.41	33,147.84
Quarantine service.....	550,310.00	549,483.24	437,357.74	112,125.50	826.76
Preventing the spread of epidemic diseases.....	400,000.00	240,690.68	237,869.98	2,820.70	159,309.32
Field investigations of public health.....	317,540.00	316,926.34	311,274.52	5,651.82	613.66
Interstate quarantine service.....	72,080.00	71,767.91	69,464.97	2,302.94	312.09
Studies of rural sanitation, Public Health Service.....	347,000.00	337,376.61	336,996.44	380.17	9,623.39
Control of biologic products, Public Health Service.....	45,000.00	44,845.56	44,315.16	530.40	154.44
Expenses, division of venereal diseases, Public Health Service.....	73,780.00	72,871.11	72,263.67	607.44	908.89
Survey of salt-marsh areas, South Atlantic and Gulf States.....	15,000.00	13,482.67	13,390.72	91.95	1,517.33
Narcotic farms, Public Health Service.....	² 10,000.00	955.30	917.49	37.81	9,044.70
Total.....	10,947,840.00	10,715,721.75	10,557,666.79	158,954.96	232,118.25

¹ Includes \$595,306 reimbursement for care of Veterans' Bureau patients and \$3,800 miscellaneous reimbursements.

² Appropriation available for fiscal years 1929 and 1930.

Quarantine service—Expenditures by stations

[Exclusive of expenditures from the appropriation "Preventing the spread of epidemic diseases"]

Name of station	Pay of officers and employees	Maintenance	Total
CONTINENTAL QUARANTINE STATIONS			
Aransas Pass, Tex.....	\$150.00		\$150.00
Baltimore, Md.....	39,260.49	\$39,249.25	78,509.74
Beaufort, S. C.....	920.00		920.00
Biscayne Bay (Miami), Fla.....	6,618.81	1,439.39	8,058.20
Boca Grande, Fla.....	2,230.00	992.72	3,222.72
Boston (Gallops Island), Mass.....	47,126.69	128,318.28	175,444.97
Brownsville, Tex.....	14,814.49	2,710.22	17,524.71
Brunswick, Ga.....	4,560.00	2,126.65	6,686.65
Cape Fear (Southport), N. C.....	8,157.48	3,097.72	11,255.20
Charleston, S. C.....	17,733.67	2,628.23	20,361.90
Columbia River (includes Astoria and Portland), Oreg.....	22,600.97	11,603.57	34,204.54
Corpus Christi, Tex.....	1,107.50	100.00	1,207.50
Cumberland Sound (Fernandina), Fla.....	720.00		720.00
Delaware Bay and River (Philadelphia), Pa.....	7,070.83	9,081.55	16,152.38
Delaware Breakwater (Lewes), Del.....		334.32	334.32
Del Rio, Tex.....	5,930.00	1,020.01	6,950.01
Eagle Pass, Tex.....	16,456.62	1,196.57	17,653.19
El Paso, Tex.....	33,144.44	3,069.30	36,213.74
Eureka, Calif.....	30.00	240.16	270.16
Freeport, Tex.....	675.00	380.00	1,055.00
Galveston, Tex.....	29,081.85	18,180.77	47,262.62
Georgetown, S. C.....	60.00		60.00
Gulfport, Miss.....	6,333.29	836.64	7,169.93
Hidalgo, Tex.....	5,362.67	854.22	6,216.89
Key West, Fla.....	5,944.68	399.52	6,344.20
Lake Sabine district (Beaumont, Port Arthur, Sabine, and Orange), Tex.....	25,100.76	3,544.50	28,645.26
Laredo, Tex.....	22,268.12	4,806.21	27,074.33
Marcus Hook, Pa.....	40,638.49	26,496.23	67,134.72
Mercedes, Tex.....	2,735.84	899.90	3,635.74
Mobile, Ala.....	25,139.49	11,322.84	36,462.33
New Bedford, Mass.....	450.00	29.07	479.07
New Orleans, La.....	73,061.77	8,069.73	81,131.50
Newport, R. I.....		5.00	5.00
New York, N. Y.....	238,609.33	106,987.98	345,597.31
Nogales, Ariz.....	8,876.80	2,271.04	11,147.84
Norfolk (Fort Monroe), Va.....	41,749.29	15,949.90	57,699.19
Pensacola, Fla.....	15,819.96	3,391.62	19,211.58
Perth Amboy, N. J.....	631.00	1,200.00	1,831.00
Portland, Me.....	16,866.06	4,360.35	21,226.41
Port San Luis, Calif.....	75.00		75.00
Port Townsend, Wash.....	18,740.52	2,091.32	20,831.84
Presidio, Tex.....	3,803.07	1,061.49	4,864.56
Providence, R. I.....	1,680.00	470.00	2,150.00
Reedy Island (Port Penn), Del.....	7,020.00	2,229.03	9,249.03
Rio Grande, Tex.....	4,205.34	218.54	4,423.88
Roma, Tex.....	3,816.17	788.66	4,604.83
St. Andrews (Panama City), Fla.....	1,200.00	150.59	1,350.59
St. George's Sound (Carabelle), Fla.....	300.00		300.00
St. John's River (Jacksonville), Fla.....	3,900.50	1,963.57	5,864.07
San Diego, Calif.....	14,426.81	3,643.41	18,070.22
San Francisco, Calif.....	73,252.76	34,464.29	10,717.05
San Pedro (Los Angeles), Calif.....	23,242.07	11,068.20	34,310.27
Savannah, Ga.....	13,805.96	4,210.39	18,016.35
Seattle, Wash.....	16,460.17	8,959.35	25,419.52
Tampa Bay, Fla.....	18,894.94	9,648.45	28,543.39
West Palm Beach, Fla.....	1,200.00		1,200.00
Zapata, Tex.....	553.33	90.00	643.33
Freight and miscellaneous expenses.....		23,438.81	23,438.81
Total continental quarantine stations.....	994,613.03	521,689.56	1,516,302.59
INSULAR QUARANTINE STATIONS			
Hawaii.....	38,499.20	13,431.99	51,931.19
Porto Rico.....	39,665.56	10,865.82	50,531.38
Virgin Islands.....	13,575.34	1,622.54	15,197.88
Total insular quarantine stations.....	91,740.10	25,920.35	117,660.45
Leprosy investigation station, Honolulu, Hawaii.....	21,665.27	1,873.33	23,538.60
Total all stations.....	1,108,018.40	549,483.24	1,657,501.64

MISCELLANEOUS RECEIPTS

(Covered into the Treasury)

The revenues derived from operations of the Public Health Service during the fiscal year 1929 are as follows:

Source	Amount
Inspection, fumigation, and disinfection of vessels at national quarantine stations.....	\$559,970.60
Care and treatment of pay patients in hospitals and at relief stations (other than Veterans' Bureau patients).....	60,985.18
Sale of rations.....	16,945.06
Sale of obsolete, condemned, and unserviceable property.....	8,068.12
Commissions on pay telephones installed in service buildings.....	554.38
Rent of land and buildings.....	150.00
Other revenues.....	4,138.62
Total.....	650,811.96

75878—29—21

INDEX

A

	Page
Aberdeen, Wash., quarantine station, report from	123-124
Accounts section (<i>see also</i> Appendix)	301
Acting assistant surgeons, number on duty	299
Administrative health practice, studies of	40-41
Ajo, Ariz., immigration station, report from	188
Aliens (<i>see also</i> Immigrants):	
Medical examination of	7-8
Medical inspection of	162, 173
Passengers inspected and certified at all ports in the United States and its dependencies and in Canada, table showing	164-168
Seamen inspected and certified at all ports in the United States and possessions, table showing	169-172
Amendments to quarantine regulations	117
Amoy, China, report from	154
Appendix (financial statement)	311-313
Attending specialists, number on duty	298

B

Baltimore, Md.:	
Marine hospital, report from	235-236
Quarantine station, report from	124-125
Beaufort, S. C., quarantine station, report from	125
Biological studies	37
Biologic products, control of	13, 69-70
Birth rate. (<i>See</i> Health conditions in United States.)	
Blaine, Wash., immigration station, report from	188
Boards convened	300
Boca Grande, Fla., quarantine station, report from	125
Boston, Mass.:	
Immigration station, report from	187
Marine hospital, report from	236
Quarantine station, report from	125-126
Brownsville, Tex., immigration station, report from	188-189
Brunswick, Ga., quarantine station, report from	126
Bryce Canyon National Park	107
Buffalo, N. Y.:	
Immigration station, report from	189
Marine hospital, report from	236
Buildings and office quarters	310
Buildings:	
Butler, vacated	20-21
Permanent, for bureau, recommendations for	25
Butler Building	20-21

C

Calais, Me., immigration station, report from	189-190
Calxico, Calif., immigration station, report from	190
California, plague-suppressive measures in	75
Cancer, studies of	11, 27-30, 71-72
Carlsbad National Monument	107
Carville, La. (National Leper Home), marine hospital, report from	236
Casa Grande National Monument	107
Chaco Canyon National Monument	107
Changes in quarantine procedure	115-117
Charleston, S. C., quarantine station, report from	126

Charts (*see also* Tables):

	Page
Average per diem cost of in-patient relief, United States marine hospitals, fiscal year 1929.....	225
Cases of venereal diseases reported to State health departments.....	275
Doses of arsphenamine distributed by State health departments.....	272
Laboratory examinations (venereal diseases), reported by State health departments.....	271
New patients admitted to clinics. Average per clinic.....	277
New venereal disease patients admitted to clinics.....	276
Patients discharged as arrested or cured. Average per clinic.....	277
Venereal disease treatments given in clinics.....	278
Chemistry, division of.....	73-74
Chicago, Ill., marine hospital, report from.....	236-237
Chief clerk's office, report of.....	309-310
Child hygiene:	
Communicable diseases of children, studies of age incidence of.....	42-43
Cooperation with other agencies.....	44
Investigations.....	41-44
Mental and physical status of children in two counties of Illinois, studies of relation between.....	43
Milk feeding of children; acute rheumatism in childhood, studies of.....	43
Physical measurements of children of native white-race stock.....	42
Studies of.....	12
Vision of school children.....	41-42
Cholera:	
Prevalence of.....	3, 114, 148, 154, 213
Vaccinations against.....	157
Cleveland, Ohio, marine hospital, report from.....	237
Coast Guard, United States.....	230-232
Collaborating and assistant collaborating epidemiologists.....	209
Columbia River, Oreg., quarantine station, report from.....	126
Commission on ship fumigation.....	119
Communicable diseases of children, studies of age incidence of.....	42-43
Conferences:	
International and other, representation at.....	184-185
Surgeon General's, with State and Territorial health officers.....	9, 112-113
Construction and repair, marine hospitals.....	233-234
Contract, dental surgeons, number on duty.....	299
Control of biologic products.....	13
Cooperation of Public Health Service with official and unofficial agencies.....	14-19
Coos Bay, Oreg., quarantine station, report from.....	126-127
Corpus Christi, Tex., quarantine station, report from.....	127
Crater Lake National Park.....	108
Cumberland Sound, Fla., quarantine station, report from.....	127
Current summaries.....	210

D

Death rate. (*See* Health conditions in the United States.)

Dengue, prevalence of.....	2
Dental treatment.....	230
Detroit, Mich.:	
Immigration station, report from.....	190
Marine hospital, report from.....	237
Diphtheria, prevalence of.....	2, 5, 214
Directories of health officers.....	216
Diseases:	
Cancer, studies of.....	71-72
Contagious and infectious, prevention of the spread in interstate commerce.....	8-9
Infectious, studies of.....	65-68
Influenza and other respiratory diseases, studies of.....	55-57
Meningococcus meningitis, studies of.....	67-68
Nutritional, studies of.....	13, 38, 65
Plague, in ground squirrels.....	75
Prevalence of.....	59, 213-216
Cholera.....	3, 114, 148, 154, 213
Dengue.....	2
Diphtheria.....	2, 5, 214

Diseases—Continued.

Prevalence of—Continued.		Page
Influenza	1-2, 3, 4, 158, 194, 208, 214,	231
Malaria		157
Measles		214
Meningococcus meningitis		2, 4,
	6, 117-118, 137, 139, 142, 147, 148, 149, 154, 156, 158, 203, 204,	214
Pellegra		5, 214-215
Plague	3, 6, 8, 114, 154, 155,	213
Pneumonia		215
Poliomyelitis		5, 215
Rocky Mountain spotted fever		215
Scarlet fever		2, 215
Smallpox	4, 6, 115, 125, 139, 148, 154, 155, 156, 157, 158, 160, 188,	215
Trachoma		158
Tuberculosis		5, 215-216
Tularaemia		5, 216
Typhoid fever	3, 4, 89-90, 95, 98, 102, 105, 106,	216
Typhus fever		5, 115, 160
Undulant fever		5, 216
Venereal		224, 273
Whooping cough		216
Yellow fever	3, 7, 114-115	
Prevention of introduction from abroad		6-7
Quarantinable, general prevalence of		114-115
Studies of—		
Trachoma		67
Tularaemia		65
Typhus fever		66
Undulant fever		65-66
Districts, public health		294-297
Domestic quarantine (<i>see also</i> Interstate Quarantine)		75-113
Douglas, Ariz., immigration station, report from		190
Duluth, Minn., immigration station, report from		191
Dust studies		35-37, 46-47

E

Eastport, Idaho, immigration station, report from	191-192
Eastport, Me.:	
Immigration station, report from	191
Quarantine station, report from	127
Economies, marine hospitals	227-228
Educational activities, venereal diseases	276
Education, public health, section of	218-219
Ellis Island, N. Y.:	
Immigration station, report from	185-187
Marine hospital, report from	238
El Paso, Tex., immigration station, report from	192
Emergency rest room, supervision of, by nursing section	308
Employees' Compensation Commission, United States	232
Epidemiologists, number on duty	299
Erie, Pa., immigration station, report from	192
Eureka, Calif., quarantine station, report from	127
European ports, medical examination at	173-184
Europe, service operations in	159-161
Evansville, Ind., marine hospital, report from	238
Expenses, marine hospital	226-227

F

Fall River, Mass.:	
Immigration station, report from	192-193
Quarantine station, report from	127
Films, safety X-ray	228
Financial statement	311-313
First aid, instruction in	229
Floating equipment	121
Foreign and Insular quarantine and immigration, report of division of	114-207

	Page
Foreign ports, reports from	154-159
Amoy, China	154
Guantanamo, Cuba	155
Guayaquil, Ecuador	155
Habana, Cuba	155-156
Hong Kong, China	156
Progreso, Mexico	156-157
Puerto Mexico, Mexico	157
Shanghai, China	157-158
Tampico, Mexico	158
Vera Cruz, Mexico	158-159
Foreign ports, transactions at	154-159
Fort Monroe, Va.:	
Immigration station, report from	193
Quarantine station, report from	127-128
Fort Stanton, N. Mex., marine hospital, report from	238-239
Fumigation and inspection of vessels	6, 124, 125, 127, 128, 129, 130, 131, 132, 133, 135, 136, 137, 138, 140, 141, 142, 143, 148, 149, 150, 153, 154, 155, 156, 157, 158, 159
Fumigation of ships, studies of (<i>see also</i> Investigations)	7

G

Galveston, Tex.:	
Quarantine station, report from	128
Relief station, report from	245
General Grant National Park	108
Glacier National Park	108
Gloucester, Mass., immigration station, report from	193
Goiter, studies of	13, 30-31
Grand Canyon National Park	108
Ground squirrels:	
Field operations for control of	75-76
Plague in	75
Gulfport, Miss., quarantine station, report from	129
Guantanamo, Cuba, report from	155
Guayaquil, Ecuador, report from	155

H

Habana, Cuba, report from	155-156
Halifax, Nova Scotia, immigration station, report from	193
Hawaii, operations of the service in	146-148
Health conditions in the United States	3-5
Health conditions, world	1-3
Health information by radio	218
Health officers, directories of	216
Hidalgo, Tex., immigration station, report from	194
Hong Kong, China, report from	156
Honolulu, Hawaii, immigration station, report from	193-194
Hospital division. (<i>See</i> Marine hospitals and relief.)	
Hot Springs, Ark., Public Health Service clinic at	275-276
Houlton, Me., immigration station, report from	194
Hygienic Laboratory, report of	64-74
Biologic products, control of	69-70
Chemistry, division of	73-74
Miscellaneous	74
Number on duty	299-300
Pathology and bacteriology, division of	65-70
Pharmacology, division of	71-73
Publications of	70-71
Studies by	13
Viruses, serums, toxins, and analogous products	74
Zoology, division of	70-71

I

	Page
Illumination, studies of	47-48
Immigrants (<i>see also</i> Aliens), prospective, examination of, abroad	163
Immigration stations, reports from	185-207
Ajo, Ariz	188
Blaine, Wash	188
Boston, Mass	187
Brownsville, Tex	188-189
Buffalo, N. Y	189
Calais, Me	189-190
Calexico, Calif	190
Detroit, Mich	190
Douglas, Ariz	190
Duluth, Minn	191
Eastport, Idaho	191-192
Eastport, Me	191
El Paso, Tex	192
Erie, Pa	192
Fall River, Mass	192-193
Fort Monroe, Va	193
Gloucester, Mass	193
Halifax, Nova Scotia	193
Hidalgo, Tex	194
Honolulu, Hawaii	193-194
Houlton, Me	194
International Falls, Minn	194
Jackman, Me	195
Jacksonville, Fla	194-195
Key West, Fla	195
Lewiston, N. Y	195
Montreal, Canada	195-196
Naco, Ariz	196
New Bedford, Mass	196
Newport, Vt	197
New York (Ellis Island), N. Y	185-187
Niagara Falls, N. Y	197
Northport, Wash	197
Noyes, Minn	197-198
Ogdensburg, N. Y	198
Philadelphia, Pa	198
Philippine Islands	198-199
Port Huron, Mich	199
Portland, Oreg	199
Porto Rico	199-200
Port San Luis, Calif	200
Presidio, Tex	200
Providence, R. I	200
Quebec, Canada	201
Rio Grande, Tex	201
Rouses Point, N. Y	201
St. John, New Brunswick	201-202
San Diego, Calif	202-203
San Francisco, Calif	203-204
San Pedro, Calif	205
Sasabe, Ariz	205
Sault Ste. Marie, Mich	202
Scobey, Mont	202
Sumas, Wash	205
Tampa, Fla	205-206
Thayer (Mercedes), Tex	206
Van Buren, Me	206
Victoria, British Columbia	206
Winnipeg, Manitoba, Canada	206-207
Yarmouth, Nova Scotia	207

Immigration visas:	Page
Distribution according to class of applicants who were medically examined at each station July 1, 1928, to June 30, 1929, table showing_	174-175
Distribution according to sex of applicants who were medically examined at each station, July 1, 1928, to June 30, 1929, table showing_	175
Number and character of the more serious mandatorily excludible conditions notified, July 1, 1928, to June 30, 1929, table showing_	184
Number and percentage of applicants medically examined for, who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929, table showing_	176
Number and percentage of nonquota applicants examined for, who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929, table showing_	178
Number and percentage of quota and nonquota applicants of each sex who were refused visas for mental conditions, July 1, 1928, to June 30, 1929, table showing_	183
Number and percentage of quota applicants examined for, who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929, table showing_	177
Number and percentage of total applicants examined for, who were refused on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929, table showing_	179
Number and percentage of total nonquota applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929, table showing_	181
Number and percentage of total quota applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929, table showing_	180
Percentage distribution of male and female applicants examined for, notified according to class of disability, July 1, 1928, to June 30, 1929, table showing_	177
Percentage distribution of male and female applicants examined for, who were refused on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929, table showing_	179
Percentage distribution of the total nonquota applicants notified for each class of disability who were refused visas on medical grounds, July 1, 1928, to June 30, 1929, table showing_	182
Percentage of male and female applicants notified for class B disabilities who were refused visas on medical grounds, July 1, 1928, to June 30, 1929, table showing_	180
Percentage distribution of the total quota applicants notified for each class of disability who were refused visas on medical grounds, July 1, 1928, to June 30, 1929_	181
Percentage distribution of total quota and nonquota applicants of each sex examined for, who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929, table showing_	178
Percentage distribution of total quota and nonquota applicants of each sex notified who were refused visas on medical grounds, July 1, 1928, to June 30, 1929, table showing_	183
Percentage distribution of total quota and nonquota applicants of each sex examined who were refused visas on medical notification, July 1, 1928, to June 30, 1929, table showing_	182
Improvements and economies_	310
Indian affairs, cooperation with the office of_	110
Industrial hygiene and sanitation:	
Cooperation with Bureau of Mines_	51
Cooperation with Government departments_	50
Cooperation with industrial and other agencies_	50-51
Industrial morbidity and mortality, studies of_	49-50
Industrial poisons, studies of_	49
Occupational health hazards, studies of_	45-48
Studies of_	12, 44-51
Tetraethyl lead, investigation of_	44-45
Industrial morbidity and mortality, studies of_	49-50
Industrial poisons, studies of_	49
Infantile paralysis. (See Poliomyelitis.)	
Influeza, prevalence of_	1-2, 3, 4, 158, 194, 208, 214, 231

	Page
In-patient relief, average per diem cost of, United States marine hospitals, fiscal year 1929, chart showing.....	225
Insane and chronic patients at marine hospitals.....	228-229
Instruction in first aid.....	229
Insular quarantine stations, transactions at (<i>see</i> Quarantine stations).....	146
International and other conferences, representation at.....	184-185
International Falls, Minn., immigration station, report from.....	194
International Office of Public Hygiene.....	119-120
Internes, number on duty.....	299
Interstate commerce, prevention of the spread of contagious diseases in.....	8-9
Interstate quarantine, report of division of.....	75-113
Interstate railroad water supplies.....	83-84
Interstate vessel water supplies.....	84
Investigations (<i>see also</i> Studies):	
Child hygiene.....	41-44
Fumigation of ships.....	134
Milk.....	11, 12, 51-53
Public-health problems.....	11-14
Railway sanitation.....	95-96
Statistical.....	55-60
Stream pollution.....	12
Tetraethyl lead.....	44-45

J

Jackman, Me., immigration station, report from.....	195
Jacksonville, Fla.:	
Immigration station.....	194-195
Quarantine station, report from.....	129
Relief station, report from.....	245

K

Key West, Fla.:	
Immigration station, report from.....	195
Marine hospital, report from.....	239-240
Quarantine station, report from.....	129
Knoxville, Tenn., trachoma hospital at.....	9, 80

L

Laboratory:	
Public Health Service, operations at.....	77-79
Trachoma.....	81
Lassen Volcanic National Park.....	108
Legislation and court decisions relating to public health.....	217
Legislation, recommendations for.....	21-22
Leprosy, studies of.....	31-35
Lewiston, N. Y., immigration station, report from.....	195
Library, Public Health Service.....	309-310
Los Angeles, Calif., relief station, report from.....	245
Louisville, Ky., marine hospital, report from.....	240

M

Malaria:	
Prevalence of.....	157
Studies of.....	12, 35-38
Malta fever. (<i>See</i> Undulant fever.)	
Manila, P. I., relief station, report from.....	245-246
Marcus Hook, Pa., quarantine station, report from.....	129-130
Marine hospitals and relief, report of division of.....	223-266
Marine hospitals and relief stations, tables showing transactions of.....	247-266
Marine hospitals and selected relief stations, abstracts of reports from.....	235-248
Marine hospitals:	
Construction and repair.....	233-234
Economies of.....	227-228
Expenses.....	226-227
Recommendations for maintenance, enlargement, and construction.....	24

Marine hospitals—Continued.

Reports from—	Page
Baltimore, Md.....	235-236
Boston, Mass.....	236
Buffalo, N. Y.....	236
Carville, La.....	236
Chicago, Ill.....	236-237
Cleveland, Ohio.....	237
Detroit, Mich.....	237
Ellis Island, N. Y.....	238
Evansville, Ind.....	238
Fort Stanton, N. Mex.....	238-239
Key West, Fla.....	239-240
Louisville, Ky.....	240
Memphis, Tenn.....	240
Mobile, Ala.....	240-241
New Orleans, La.....	241
New York, N. Y.....	241-242
Norfolk, Va.....	242
Pittsburgh, Pa.....	242-243
Portland, Me.....	243
Port Townsend, Wash.....	243
St. Louis, Mo.....	243
San Francisco, Calif.....	243-244
Savannah, Ga.....	244
Stapleton, N. Y.....	244
Vineyard Haven, Mass.....	244-245
Supplies.....	234
Welfare work.....	228
Maritime quarantine, recommendations for.....	22-23
Measles, prevalence of.....	214
Medical care and treatment of merchant seamen and other authorized beneficiaries.....	9-10
Medical examination (<i>see also</i> Medical inspection):	
Aliens.....	7-8
European ports, in.....	173-184
Medical inspection (<i>see also</i> Medical examination), aliens.....	162
Medicinal liquors and narcotics for vessels.....	234-235
Memphis, Tenn., marine hospital, report from.....	240
Meningitis, cerebrospinal. (<i>See</i> Meningococcus meningitis.)	
Meningococcus meningitis:	
Prevalence of.....	2,
4, 6, 117-118, 137, 139, 142, 147, 148, 149, 154, 156, 158, 203, 204, 214	
Studies of.....	13, 67-68
Mental and physical status of children, studies of relation between.....	43
Merchant seamen and other authorized beneficiaries, medical care and treatment of.....	9-10
Mesa Verde National Park.....	108-109
Mexican border, quarantine operations along the.....	144-145
Miami, Fla., quarantine station, report from.....	130
Milk feeding of children; acute rheumatism in childhood, studies of.....	43-44
Milk investigations.....	11, 12, 51-53
Mobile, Ala.:	
Marine hospital, report from.....	240-241
Quarantine station, report from.....	130-131
Montezuma Castle National Monument.....	109
Montreal, Canada, immigration station, report from.....	195-196
Morbidity and mortality reports.....	208-216
Annual State morbidity reports.....	210
City reports.....	210-211
Collaborating and assistant collaborating epidemiologists.....	209
Current monthly mortality statistics.....	208-209
Current summaries.....	210
Foreign reports.....	212
Insane, feeble-minded, and epileptic.....	211-212

Morbidity and mortality reports—Continued.	Page
International exchange of sanitary information	212
Monthly State reports	210
Weekly telegraphic reports	210
Mortality statistics, current monthly	208-209
Mosquito, salt-marsh, studies of	12
Mount McKinley National Park	109
Mount Rainier National Park	109

N

Naco, Ariz., immigration station, report from	196
Narcotics division:	
Creation of	11
Recommendations for	24
Report of	292
National parks and monuments, sanitation in	107-110
National monuments:	
Carlsbad	107
Casa Grande	107
Chaco Canyon	107
Montezuma Castle	109
Petrified Forest	109
Pinnacles	109
Tumacoccori	109
National parks:	
Bryce Canyon	107
Crater Lake	108
General Grant	108
Glacier	108
Grand Canyon	108
Lassen Volcanic	108
Mesa Verde	108-109
Mount McKinley	109
Mount Rainier	109
Platt	109
Rocky Mountain	109
Sequoia	109
Yellowstone	109-110
Yosemite	110
Zion	110
New Bedford, Mass.:	
Immigration station, report from	196
Quarantine station, report from	131
New London, Conn., quarantine station, report from	131
New Orleans, La.:	
Marine hospital, report from	241
Quarantine station, report from	131-132
Newport, R. I., quarantine station, report from	132-133
Newport, Vt., immigration station, report from	197
New York, N. Y.:	
Marine hospital, report from	241-242
Quarantine station, report from	132-134
Niagara Falls, N. Y., immigration station, report from	197
Norfolk, Va., marine hospital, report from	242
Northport, Wash., immigration station, report from	197
Noyes, Minn., immigration station, report from	197-198
Nursing, dietetic, and reconstruction, report of section of	307-308

O

Oakland, Calif., rat survey in	76
Officers:	
Commissioned medical, number on duty	297-298
Reserve, number on duty	298
Occupational health hazards, studies of	45-48
Ogdensburg, N. Y.:	
Immigration station, report from	198
Quarantine station, report from	134-135

P

	Page
Pathology and bacteriology, division of	65-70
Biologic products, control of	69-70
Neuropsychiatric studies	70
Pathology studies	68
Patients treated annually, 1868 to 1929, table showing number of	248
Pellagra:	
Prevalence of	5, 214-215
Studies of	38
Pensacola, Fla., quarantine station, report from	135
Personnel (<i>see also</i> Personnel and Accounts)	19-20
Acting assistant surgeons	299
Attending specialists	298
Commissioned medical officers	297-298
Contract dental surgeons	299
Epidemiologists, number on duty	299
Force on duty in the bureau	309
Hygienic Laboratory	299-300
Internes	299
Pharmacists and administrative assistants	300
Nurses, aides, and dietitians	307
Reserve officers	298
Statement of	301-306
Personnel and Accounts, report of division of	293-306
Perry Point, Md., supply station, report from	246-247
Perth Amboy, N. J., quarantine station, report from	135
Petrified Forest National Monument	109
Pharmacists and administrative assistants, number on duty	300
Pharmacology, division of	71-73
Philadelphia, Pa., immigration station, report from	198
Philippine Islands:	
Immigration station, report from	198-199
Operations of the service in	148-150
Physical examinations given by Public Health Service	232
Physical measurements of children of native white-race stock, studies of	42
Pinnacles National Monument	109
Pittsburgh, Pa., marine hospital, report from	242-243
Plague:	
In ground squirrels	75
Prevalence of	3, 6, 8, 114, 154, 155, 213
Suppressive measures in California	75
Platt National Park	109
Plymouth, Mass., quarantine station, report from	136
Pneumonia:	
Prevalence of	215
Studies of	67
Poliomyelitis:	
Prevalence of	5, 215
Studies of	67
Port Huron, Mich., immigration station, report from	199
Portland, Me., marine hospital, report from	243
Portland, Oreg.:	
Immigration station, report from	199
Quarantine station, report from	136
Porto Rico:	
Immigration station, report from	199-200
Operations of the service in	150-152
Port San Luis, Calif.:	
Immigration station, report from	200
Quarantine station, report from	136-137
Port Townsend, Wash.:	
Marine hospital, report from	243
Quarantine station, report from	137
Presidio, Tex., immigration station, report from	200
Printing and binding	310
Progreso, Mexico, report from	156-157
Property records	301

Providence, R. I.:	Page
Immigration station, report from.....	200
Quarantine station, report from.....	137
Publications:	
Distributed by division of sanitary reports and statistics.....	219-222
Division of sanitary reports and statistics.....	217-218
Hygienic Laboratory.....	70-71
Sanitary reports and statistics, issued by division of.....	217-218
Public health districts, reports from.....	294-297
Public health educational exhibits, recommendations for.....	25
Public health:	
Education, section of.....	218-219
Engineering Abstracts.....	85-86
Legislation and court decisions relating to.....	217
Problems, investigations of.....	11-14
Public Health Service:	
Cooperation with official and unofficial agencies.....	14-19
Laboratory, operation of.....	77-79
Library.....	309-310
Physical examinations given by.....	232
Public Hygiene, International Office of.....	119-120
Puerto Mexico, Mexico, report from.....	157

Q

Quarantinable diseases, general prevalence of.....	114-115
Quarantine laws, violations of.....	121
Quarantine measures.....	7
Quarantine operations along the Mexican border.....	144-145
Quarantine procedure, changes in.....	115-117
Quarantine regulations, amendments to.....	117
Quarantine stations, continental, reports from.....	123-143
Aberdeen, Wash.....	123-124
Baltimore, Md.....	124-125
Beaufort, S. C.....	125
Boca Grande, Fla.....	125
Boston, Mass.....	125-126
Brunswick, Ga.....	126
Charleston, S. C.....	126
Columbia River, Oreg.....	126
Coos Bay, Oreg.....	126, 127
Corpus Christi, Tex.....	127
Cumberland Sound, Fla.....	127
Eastport, Me.....	127
Eureka, Calif.....	127
Fall River, Mass.....	127
Fort Monroe, Va.....	127-128
Galveston, Tex.....	128
Gulfport, Miss.....	129
Jacksonville, Fla.....	129
Key West, Fla.....	129
Marcus Hook, Pa.....	129-130
Miami, Fla.....	130
Mobile, Ala.....	130-131
New Bedford, Mass.....	131
New London, Conn.....	131
New Orleans, La.....	131-132
Newport, R. I.....	132-133
New York, N. Y.....	133-134
Ogdensburg, N. Y.....	134-135
Pensacola, Fla.....	135
Perth Amboy, N. J.....	135
Plymouth, Mass.....	136
Portland, Oreg.....	136
Port San Luis, Calif.....	136-137
Port Townsend, Wash.....	137
Providence, R. I.....	137
Sabine, Tex.....	137-138
San Diego, Calif.....	138-139

Quarantine stations, continental, reports from—Continued.	Page
San Francisco, Calif.....	139-140
San Pedro, Calif.....	140-141
Savannah, Ga.....	141
Seattle, Wash.....	141-143
South Bend, Wash.....	143
Tampa, Fla.....	143
Quarantine stations, insular, reports from.....	146-153
Hawaii.....	146-148
Philippine Islands.....	148-150
Porto Rico.....	150-152
Virgin Islands.....	152-153
Quarantine transactions.....	114
Quarantine transactions, summary of:	
Continental and insular quarantine stations.....	121-122
Continental, insular, and foreign stations.....	162
Continental maritime stations.....	123
Mexican border.....	144
Quebec, Canada, immigration station, report from.....	201

R

Radio, health information by.....	218
Railroad water supply.....	99-100
Supervision of.....	90-91, 102-103, 106-107
Railway sanitation, investigations of.....	95-96
Rat and rat-flea surveys.....	133, 151-152, 153
Rat proofing of vessels, approved specifications for.....	134
Rats:	
Classification of.....	78, 140
Measures taken against.....	76-77
Rat trapping on vessels. (See Vessels, fumigation and inspection of.)	
Recommendations for:	
Building, permanent, for bureau.....	25
Legislation.....	21-22
Marine hospitals, maintenance, enlargement, and construction of.....	24
Maritime quarantine.....	22-23
Narcotics division.....	24
Public health educational exhibits.....	25
Reports on prevalence of diseases, collection of.....	24
Rural health work.....	24
Scientific research.....	22
Records, property.....	301
Relief stations, selected, reports from:	
Galveston, Tex.....	245
Jacksonville, Fla.....	245
Los Angeles, Calif.....	245
Manila, P. I.....	245-246
San Juan, P. R.....	246
Seattle, Wash.....	246
Southport, N. C.....	246
Reports:	
Abstracts of, from marine hospitals and selected relief stations.....	235-248
Annual State morbidity.....	210
City.....	210-211
Foreign.....	212
Insane, feeble-minded, and epileptic.....	211-212
International exchange of sanitary information.....	212
Laboratory, consolidated marine hospital.....	247
Monthly State.....	210
Prevalence of disease, recommendations for collection of.....	24
Surgical procedures, consolidated, at marine hospitals and other relief stations.....	248
Weekly telegraphic.....	210
X-ray, consolidated, marine hospitals and second-class relief stations.....	247
Richmond, Ky., trachoma hospital at.....	9, 80
Rio Grande, Tex., immigration station, report from.....	201
Rocky Mountain National Park.....	109

Rocky Mountain spotted fever:	Page
Prevalence of.....	215
Studies of.....	38-40
Vaccine, preventive.....	39
Rolla, Mo., trachoma hospital at.....	9, 80-81
Rouses Point, N. Y., immigration station, report from.....	201
Rural health work, recommendations for.....	24, 111-112

S

Sabine, Tex., quarantine station, report from.....	137-138
Safety X-ray films.....	228
St. John, New Brunswick, immigration station, report from.....	201-202
St. Louis, Mo., marine hospital, report from.....	243
Salt-marsh areas:	
Studies of.....	37-38
Survey of.....	53-55
San Diego, Calif.:	
Immigration station, report from.....	202-203
Quarantine station, report from.....	138-139
San Francisco, Calif.:	
Immigration station, report from.....	203-204
Marine hospital, report from.....	243-244
Quarantine station, report from.....	139-140
Rat survey in.....	76
Sanitary districts, interstate.....	87-111
Cooperation with city health departments.....	107
Cooperation with other Federal organizations.....	104-105
Cooperation with other Government bureaus and State health departments.....	96, 104
Cooperation with the office of Indian Affairs, Department of Justice, and State health departments.....	100-101, 110
Cooperation with the United States Forest Service.....	111
Miscellaneous activities.....	91, 101, 105, 111
National parks and monuments, sanitation in.....	107-110
Personnel and activities.....	91-92
Railroad water-supply supervision.....	90-91, 99-100, 102-103, 106-107
Railway sanitation, investigations of.....	95-96
Shellfish sanitation.....	85, 87-88, 92-94, 103-104, 111
Vessel water supply systems and sanitation, supervision over.....	88-90, 94-95, 97-99, 101-102, 106
Sanitary engineering section.....	82-111
Sanitary reports and statistics, report of division of.....	208-222
Sanitary work, cooperative.....	86
San Juan, P. R., relief station, report from.....	246
San Pedro, Calif.:	
Immigration station, report from.....	205
Quarantine station, report from.....	140-141
Sasabe, Ariz., immigration station, report from.....	205
Sault Ste. Marie, Mich., immigration station, report from.....	202
Savannah, Ga.:	
Marine hospital, report from.....	244
Quarantine station, report from.....	141
Scarlet fever, prevalence of.....	2, 215
Scientific research:	
Recommendations for.....	22
Report of division of.....	27-74
Veneral diseases.....	267-268
Scobey, Mont., immigration station, report from.....	202
Screening studies.....	35
Seattle, Wash.:	
Quarantine station, report from.....	141-143
Relief station, report from.....	246
Sequoia National Park.....	109
Service operations in Europe.....	159-161
Shanghai, China, report from.....	157-158
Shellfish sanitation.....	85, 87-88, 92-94, 103-104, 111
Ship fumigation, commission on.....	119

	Page
Smallpox:	
Prevalence of_ _ _ 4, 6, 115, 125, 139, 148, 154, 155, 156, 157, 158, 160, 188, 215	215
Vaccinations for_ _ _ _ _ 144, 149, 155, 156, 160, 204	204
Vaccination, studies of_ _ _ _ _	66-67
Vaccine, studies of_ _ _ _ _	13
South Bend, Wash., quarantine station, report from_ _ _ _ _	143
Southport, N. C.; relief station, report from_ _ _ _ _	246
Stapleton, N. Y.:	
Marine hospital, report from_ _ _ _ _	244
Venereal disease studies at marine hospital_ _ _ _ _	268
Statistical investigations_ _ _ _ _	55-60
Cooperation with other offices and divisions of the service_ _ _ _ _	59-60
Current prevalence of disease_ _ _ _ _	59
Influenza and other respiratory diseases, studies of_ _ _ _ _	55-57
Morbidity statistics, studies on_ _ _ _ _	57-58
Mortality statistics, studies of current_ _ _ _ _	58-59
Negro mortality, studies of_ _ _ _ _	59
Stream pollution:	
Investigations_ _ _ _ _	12
Studies of_ _ _ _ _	60-64
Studies. (See also Investigations.)	
Administrative health practice_ _ _ _ _	40-41
Biological_ _ _ _ _	37
Cancer_ _ _ _ _ 11, 27-30, 71-72	71-72
Child hygiene_ _ _ _ _	12
Dust_ _ _ _ _ 35-37, 46-47	46-47
Fumigation of ships_ _ _ _ _	7
Goiter_ _ _ _ _ 13, 30-31	30-31
Hygienic Laboratory_ _ _ _ _	13
Industrial hygiene_ _ _ _ _ 12, 44-51	44-51
Industrial morbidity and mortality_ _ _ _ _	49-50
Industrial poisons_ _ _ _ _	49
Infectious diseases_ _ _ _ _	65-68
Influenza and other respiratory diseases_ _ _ _ _	55-57
Illumination_ _ _ _ _	47-48
Leprosy_ _ _ _ _	31-35
Malaria_ _ _ _ _ 12, 35-38	35-38
Meningococcus meningitis_ _ _ _ _ 13, 67-68	67-68
Morbidity statistics_ _ _ _ _	57-58
Mortality statistics, current_ _ _ _ _	58-59
Mosquito, salt-marsh_ _ _ _ _	12
Negro mortality_ _ _ _ _	59
Neuropsychiatric_ _ _ _ _	70
Nutritional diseases_ _ _ _ _ 13, 38, 65	38, 65
Occupational health hazards_ _ _ _ _	45-48
Pathology_ _ _ _ _	68
Pellagra_ _ _ _ _	38
Pneumonia_ _ _ _ _	67
Poliomyelitis_ _ _ _ _	67
Rocky Mountain spotted fever_ _ _ _ _	38-40
Salt-marsh_ _ _ _ _	37-38
Screening_ _ _ _ _	35
Smallpox vaccination_ _ _ _ _	66-67
Smallpox vaccine_ _ _ _ _	13
Stream pollution_ _ _ _ _	60-64
Trachoma_ _ _ _ _ 40, 67, 79-82	79-82
Tularaemia_ _ _ _ _ 13, 40, 65	40, 65
Typhus fever_ _ _ _ _	66
Undulant fever_ _ _ _ _ 13, 65-66	65-66
Venereal diseases_ _ _ _ _	268-273
Sumas, Wash., immigration station, report from_ _ _ _ _	205
Supplies, hospital_ _ _ _ _	234
Supply station, Perry Point, Md_ _ _ _ _	246-247
Surveys:	
Rat and rat-flea_ _ _ _ _ 133, 151-152, 153	151-152, 153
Rat, in San Francisco and Oakland_ _ _ _ _	76
Salt-marsh areas_ _ _ _ _	53-55

T

Tables (*see also* Charts):

	Page
Activities of State health departments for the control of venereal diseases, July 1, 1928, to June 30, 1929-----	281
Alien passengers inspected and certified at all ports in the United States and its dependencies and in Canada-----	164-168
Alien seamen inspected and certified at all ports in the United States and possessions-----	169-172
Annual rate per 1,000 inhabitants of new admissions to clinics and of total treatments given in clinics, from July 1, 1928, to June 30, 1929-----	283
Beneficiaries, classes of, and amount and character of services rendered-----	223-224
Classification of out-patient treatments furnished at United States marine hospitals and other relief stations, fiscal year 1929-----	261
Cases of venereal diseases reported to State health departments and reported venereal disease incidence per 1,000 inhabitants, July 1, 1928, to June 30, 1929-----	282
Causes of admission for discharged patients and condition on discharge, United States marine hospitals and other relief stations, fiscal year 1929-----	255-256
Death, causes of, in United States marine hospitals and other relief stations, fiscal year 1929-----	257-258
Distribution according to class of applicants for immigration visas who were medically examined at each station, July 1, 1928, to June 30, 1929-----	174-175
Distribution according to sex of applicants for immigration visas who were medically examined at each station, July 1, 1928, to June 30, 1929-----	175
Medical inspection of aliens, summary of-----	173
Nativity by beneficiary of patients discharged from United States marine hospitals and other relief stations, fiscal year 1929-----	262-263
Nativity by beneficiary of patients who died in United States marine hospitals and other relief stations, fiscal year 1929-----	264-265
Number and character of the more serious mandatorily excludable conditions notified, July 1, 1928, to June 30, 1929-----	184
Number and percentage of applicants medically examined who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929-----	176
Number and percentage of nonquota applicants examined who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929-----	178
Number and percentage of quota and nonquota applicants of each sex who were refused visas for mental conditions, July 1, 1928, to June 30, 1929-----	183
Number and percentage of quota applicants examined who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929-----	177
Number and percentage of total applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929-----	179
Number and percentage of total nonquota applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929-----	181
Number and percentage of total quota applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929-----	180
Number of days in hospital for patients discharged from United States marine hospitals and other relief stations, by broad groups of conditions and class of beneficiary, fiscal year 1929-----	260-261
Number of discharged American seamen admitted with specified diseases or injuries as a major condition-----	266
Number of each class of beneficiary discharged from United States marine hospitals and other relief stations, fiscal year 1929-----	259
Quarantine transactions at continental and insular quarantine stations-----	121-122

Tables—Continued.

	Page
Quarantine transactions at continental, insular, and foreign stations, fiscal year 1929, summary of	162
Quarantine transactions at continental maritime stations	123
Quarantine transactions on the Mexican border	144
Patients, number of, treated annually, 1868 to 1929	248
Percentage distribution of male and female applicants examined, notified according to class of disability, July 1, 1928, to June 30, 1929	177
Percentage distribution of male and female applicants examined who were refused visas on medical notification for different classes of disabilities, July 1, 1928, to June 30, 1929	179
Percentage distribution of the total nonquota applicants notified for each class of disability who were refused visas on medical grounds, July 1, 1928, to June 30, 1929	182
Percentage distribution of the total quota applicants notified for each class of disability who were refused visas on medical grounds, July 1, 1928, to June 30, 1929	181
Percentage distribution of total quota and nonquota applicants of each sex examined who were notified for different classes of disabilities, July 1, 1928, to June 30, 1929	178
Percentage distribution of total quota and nonquota applicants of each sex examined who were refused visas on medical notification, July 1, 1928, to June 30, 1929	182
Percentage distribution of total quota and nonquota applicants of each sex notified who were refused visas on medical grounds, July 1, 1928, to June 30, 1929	183
Percentage of male and female applicants notified for class B disabilities who were refused visas on medical grounds, July 1, 1928, to June 30, 1929	180
Primary treatment of passengers and crew prior to embarkation	160
Primary treatment of passengers proceeding to another port for embarkation	161
Rat-flea survey at San Juna, P. R.	152
Relief furnished at United States marine hospitals and other relief stations, classified by beneficiary, fiscal year 1929	252-254
Report of cooperative clinic activities furnished through State health departments from 1919 to 1929	290
Report of cooperative clinics furnished through State health departments, from July 1, 1928, to June 30, 1929	283-289
Report of 72 correctional institutions	290
Report of the United States Public Health Service clinic at Hot Springs National Park, Ark., from July 1, 1928, to June 30, 1929 ..	280-281
Statistical summary of activities in the control of venereal diseases for the fiscal years 1928 and 1929	290-291
Transactions at foreign ports, summary	154
Transactions at insular stations for fiscal year ended June 30, 1929, summary of	146
Transactions at United States marine hospitals and other relief stations, fiscal year 1929	249-251
Treatment of baggage, vessels, and service beneficiaries	161
Treatment of passengers coming from other points for embarkation (transmigrants)	161
Tampa, Fla.:	
Immigration station, report from	205-206
Quarantine station, report from	143
Tampico, Mexico, report from	158
Tetraethyl lead, investigation of	44-45
Thayer (Mercedes), Tex., immigration station, report from	206
Trachoma:	
Eradication work	79-82
Laboratory	81
Prevalence of	158
Studies of	40, 67
Trachoma hospitals:	
Knoxville, Tenn.	9, 80
Richmond, Ky.	9, 80
Rolla, Mo.	9, 80-81

	Page
Tuberculosis, prevalence of.....	5, 215-216
Tularaemia:	
Prevalence of.....	5, 216
Studies of.....	13, 40, 65
Tumacocori National Monument.....	109
Typhoid fever, prevalence of.....	3, 4, 89-90, 95, 98, 102, 105, 106, 216
Typhus fever:	
Prevalence of.....	5, 115, 160
Studies of.....	66
Vaccination against.....	144, 160

U

Undulant fever:	
Prevalence of.....	5, 216
Studies of.....	13, 65-66
United States Coast Guard.....	230-232
United States Employees' Compensation Commission.....	232
United States, health conditions in.....	3-5

V

Vaccinations:	
Cholera.....	157
Smallpox.....	144, 149, 155, 156, 160, 204
Studies of.....	66-67
Typhus fever.....	144, 160
Van Buren, Me., immigration station, report from.....	206
Venereal diseases:	
Activities of State health departments, table showing.....	281
Campaign for prevention of, among seamen.....	277-280
Cases of, reported to State health departments, chart showing.....	275
Cases of, reported to State health departments, July 1, 1928, to June 30, 1929, table showing.....	282
Clinic at Hot Springs, Ark.....	275-276
Control among seamen.....	98
Cooperative activities with States.....	273-274
Doses of arsphenamine distributed by State health departments, chart showing.....	272
Educational activities.....	276
Laboratory examinations reported by State health departments, chart showing.....	271
New patients admitted to clinics. Average per clinic, chart showing.....	277
New patients admitted to clinics. chart showing.....	276
Patients discharged as arrested or cured. Average per clinic, chart showing.....	277
Prevalence of.....	224, 273
Prevention and control of.....	10
Report of clinic at Hot Springs, Ark., table showing.....	280-281
Reports of clinics, July 1, 1928, to June 30, 1929, tables showing.....	283-290
Reports of 72 correctional institutions.....	290
Report of division of.....	267-291
Scientific research.....	267-268
Statistical summary of activities in the control of, fiscal years 1928 and 1929.....	290-291
Studies of.....	268-273
Treatments given in clinics, chart showing.....	278
Vera Cruz, Mexico, report from.....	158-159
Vessels:	
Approved specifications for rat proofing of.....	134
Floating equipment.....	121
Fumigation and inspection of.....	6, 124, 125, 127, 128, 129, 130, 131, 132, 133, 135, 136, 137, 138, 140, 141, 142, 143, 148, 149, 150, 153, 154, 155, 156, 157, 158, 159.
Inspection of (<i>see also</i> Fumigation and inspection of).....	6
Medicinal liquors and narcotics for.....	234-235
Water supply and sanitation, supervision of.....	88-90, 94-95, 97-99, 101-102, 106
Victoria, British Columbia, immigration station, report from.....	206

	Page
Vineyard Haven, Mass., marine hospital, report from.....	244-245
Violations of quarantine laws.....	121
Virgin Islands, operation of the service in.....	152-153
Viruses, serums, toxins, and analogous products.....	74
Vision of school children.....	41-42

W

Water supplies:	
Interstate railroad.....	83-84
Interstate vessel.....	84
Railroad, systems and sanitation, supervision over.....	90-91, 99-100, 102-103, 106-107
Used by common carriers, supervision of.....	82
Vessel, systems and sanitation, supervision over.....	85, 88-90, 94-95, 97-99, 101-102, 106
Welfare work, marine hospitals.....	228
Whooping cough, prevalence of.....	216
Winnipeg, Manitoba, Canada, immigration station, report from.....	206-207
World health conditions.....	1-3

Y

Yarmouth, Nova Scotia, immigration station, report from.....	207
Yellow fever, prevalence of.....	3, 7, 114-115
Yellowstone National Park.....	109-110
Yosemite National Park.....	110

Z

Zion National Park.....	110
Zoology, division of.....	70-71



